AVIATION WEEK
A McGRAW-HILL PUBLICATION
AUG. 15, 194

TECHNOLOGY DEPT.
PUBLIC LIBRARY
NOV 21 19
DETROIT

Grumman

Designers and builders of AIRCRAFT

New Navy Jet-Fighters

As the Navy carries out its global missions of national defense Grumman Panthers strengthen the fleet. These new land and carrier based fighters can attack swiftly with destructive striking power. Traditionally rugged, Grumman Panthers are designed for top performance under severest conditions.

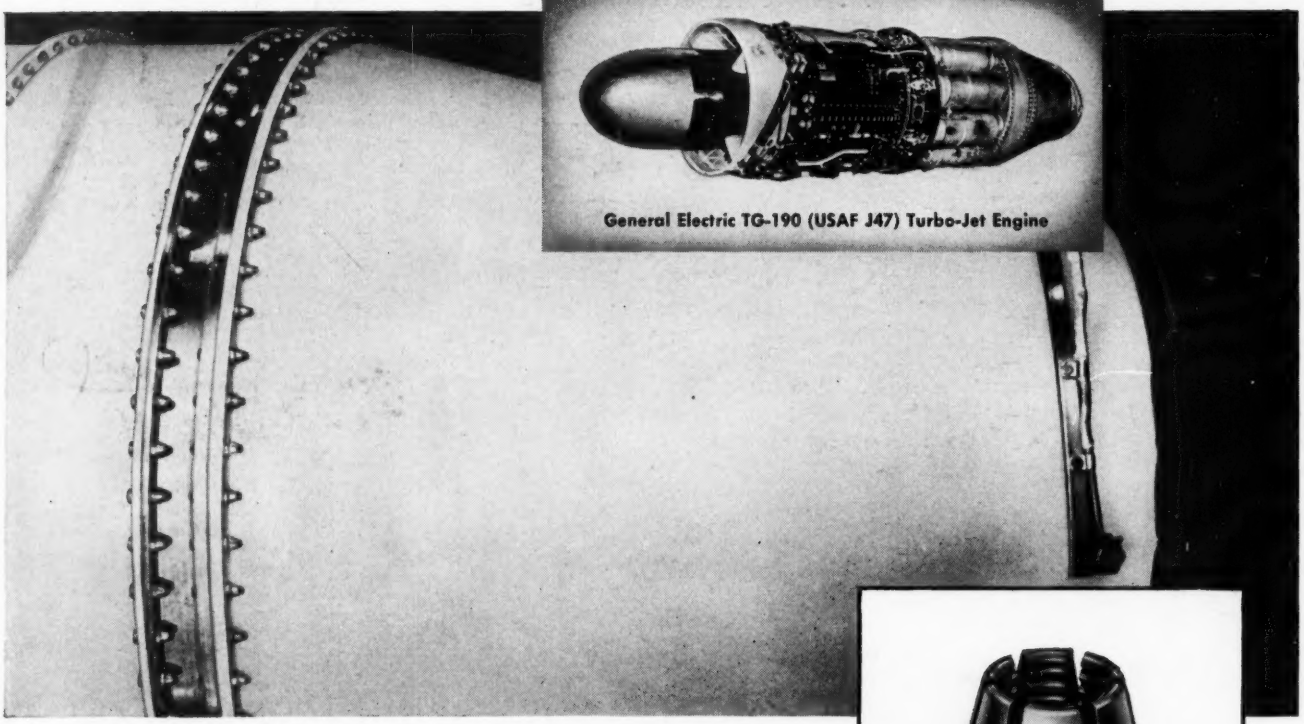
★ ★ ★

GRUMMAN AIRCRAFT ENGINEERING CORPORATION, BETHPAGE, LONG ISLAND, NEW YORK

Contractors to the Armed Services

NEW! *High-Temp Nut* HOLDS WITHOUT SEIZURE AT 1200°F.

General Electric TG-190 (USAF J47) Turbo-Jet Engine



Self-locking Elastic Deflection protects against VIBRATION! *permits* INTERCHANGEABILITY!

The extreme heat generated in exhaust manifold systems, turbo-jet tail cones and similar installations create strength and seizure problems in ordinary fasteners—problems that are solved by ESNA's NEW Z-1200 Hex and Anchor Nuts.

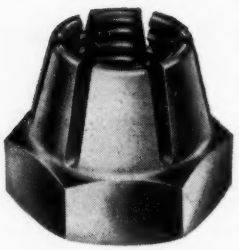
These new nuts shown above on the tail cone flanges of the General Electric TG-190 retain their strength and locking torque characteristics even after repeated use at 1200°F. They are readily removed . . . do not seize the bolt or damage the threads.

Further, the elastic deflection built into the Z-1200's locking-beams makes them re-usable—interchangeably . . . because exact design assures locking torque within the tolerance range of Class 3 bolts.

ESNA Z-1200 Nuts—like all Elastic Stop Nuts—are designed for rapid field service replacements to simplify maintenance. They are self-locking anywhere on a bolt or stud without frictional aid from bolt tension or seat pressure.

HERE'S A CHALLENGE. Send us complete details of your toughest bolted trouble spot. We'll supply test nuts—FREE, in experimental quantities. Or, if you want further information, write for literature.

Elastic Stop Nut Corporation of America, Union, New Jersey. Representatives and Agents are located in many principal cities.



HIGH TEMPERATURE NUTS
HEX AND ANCHOR—FOR 1200°F
(Esna Type Z-1200)

Stainless Steel type 18-8 Columbium stabilized, silver plated, the new ESNA Z-1200 nuts will NOT seize the bolt or gall the finish. Vibration, impact or stress reversal will not disturb their pre-stressed or positioned settings.

THEY ARE RE-USABLE

ELASTIC STOP NUTS

HIGH TENSILE

ANCHOR

WING

SPLINE

CLINCH

GANG CHANNEL

NYLON CAP

OVER 450 TYPES AND SIZES IMMEDIATELY AVAILABLE FROM STOCK

Clipper Seals are used in two of the most critical mechanical centers of this Piasecki Model HRP-1 Helicopter. Here these flexible, non-metallic J-M oil seals safeguard clutch and transmission bearing mechanisms within the fore and aft rotor assemblies.

"Flying BANANA" hops and skips... with Clipper Seals

Like Piasecki, you'll find that Clipper Seals have many attributes that make them well suited to critical oil sealing jobs in aviation.

For example, Clipper Seals are flexible . . . which assures plenty of give and take for maintaining a tight seal even under the most severe operating conditions.

They are also corrosion resistant. Clipper Seal's molded body is entirely non-metallic, and is therefore unaffected by electrolysis and most forms of corrosion. To meet unusual conditions, the garter spring which holds the lip in contact with the shaft is available in various corrosion-resistant metals . . . or Clipper Seals of special design that do not require springs can be furnished.

These unique oil seals offer unusual design possibilities, too. They can be furnished in flange sections of varying widths to fit practically any cavity. Furthermore, the Clipper Seal has no metal case and is of flexible molded construction. This permits liberal machining tolerances in the design of the cavity.

To find out more about Clipper Seals and their application to your sealing problems, write Johns-Manville, Box 290, New York 16, N. Y. Ask for folder PK-31A.

Furnished as a split seal, too

For applications on inaccessible shafts such as the one shown above on an aircraft reciprocating engine, the split-type Clipper Seal simplifies installation, saves costly "down time." It can actually be installed in a matter of seconds. And removed just as quickly and easily—and without damage!

JOHNS-MANVILLE JM PRODUCTS **Johns-Manville** *PRODUCTS for the AVIATION INDUSTRY*

Packings and Gaskets • Friction Materials • Insulations • Asbestos Textiles
Transite Conduit • Transite Pipe • Industrial Building Materials

Auburn

Threaded-type Jet Ignitor GLOW PLUGS

Designed and made in any size to meet your requirements.

Let us figure on your needs

Also makers of flange and threaded type jet ignitor spark plugs

Plug shown is actual size

Five years of specializing in turbo-jet, jet prop and rocket spark plugs and ignition parts. Makers of

- Quick-action Thermocouples
- Thermocouple Spark Plugs
- Glow Plugs
- Tail-burning Ignitors
- Aircraft Spark Plug Connectors
- Neoprene Terminal Collars

AUBURN
SPARK PLUG CO., INC.
AUBURN, N. Y.

Aircraft Division
1180 Raymond Blvd., Newark 2, N. J.

Export Office
120 W. 42nd St., New York 18, N. Y.

In Canada

Railway & Power Engineering Corp., Ltd.
Montreal • Noranda • North Bay • Toronto
Hamilton • Windsor • Winnipeg
Sydney, Nova Scotia • Vancouver

Vol. 51, No. 7

AVIATION WEEK

August 15, 1949

News Sidelights	7	Engineering Forum	42
Aviation Calendar	8	New Products	45
News Digest	9	Production	47
Who's Where	11	Sales & Service	51
Industry Observer	11	Air Transport	52
Headline News	13	Strictly Personal	64
Financial	18	What's New	64
Aeronautical Engineering	21	Letters	66

Robert H. Wood
EDITOR

Merlin H. Mickel
MANAGING EDITOR

William Kroger.....ASSISTANT MANAGING EDITOR

Robert B. Hotz.....News Editor
Irving Stone.....Technical Editor
Alexander McSurely..Manufacturing Editor
Charles L. Adams.....Transport Editor
Robert McLarren.....Engineering
Katherine Johnsen.....Congress
Stanley L. Colbert....Assistant News Editor
Marie Adams.....Editorial Assistant
Scott H. Reiniger.....Editorial Assistant
Victoria Giaculli.....Editorial Assistant
Henry Lefer.....Editorial Makeup

Executive and Editorial Offices: 330 W. 42d St., New York 18, N. Y., Phone Longacre 4-3035; National Press Bldg., Washington 4, D. C., Phone National 3414

Domestic News Bureaus: Atlanta 3, Rhodes-Haverty Bldg.; Chicago 11, 520 N. Michigan Ave.; Cleveland 15, Hanna Bldg.; Detroit 26, Penobscot Bldg.; Los Angeles 14, 621 S. Hope St.; San Francisco 4, 68 Post St.; Houston, 514 South St. *Correspondents:* Boston, Buffalo, Dallas, Dayton, Denver, Indianapolis, Jacksonville, Kansas City, Knoxville, Lansing, Louisville, Memphis, Miami, Milwaukee, New Orleans, Oklahoma City, Ogden, Philadelphia, Phoenix, Pittsburgh, Portland (Ore.), St. Louis, Salt Lake City, Seattle, Wichita and 43 other cities.

Foreign News Bureaus: London, Paris, Frankfurt, Tokyo, Bombay, Melbourne, Rio de Janeiro, Mexico City. Correspondents in Athens, Moscow, Buenos Aires, Shanghai, Zurich, Rome, Johannesburg and over 40 other cities.

ECONOMICS STAFF
Dexter M. Keezer, Sanford S. Parker, William F. Butler. Robert P. Ulin.

Robert F. Boger
PUBLISHER

J. G. Johnson, *Business Manager;* R. W. Martin, Jr., *Sales Manager;* Sales Representatives: J. C. Anthony, New York; M. J. Storz, Philadelphia; V. K. Dissette, Cleveland; L. J. Biehl, Chicago; W. E. Donnell, St. Louis; J. H. Allen, Dallas; R. C. Maultsby, Atlanta; J. W. Otterson, San Francisco; C. F. McReynolds, Los Angeles. Other sales offices in Pittsburgh, Detroit, Boston and London.

Member of Associated Business Papers, Inc., and the Audit Bureau of Circulations

McGRAW-HILL PUBLISHING CO., Inc., James H. McGraw (1860-1948), Founder. Publishing Office, 99-129 N. Broadway, Albany, N. Y. Editorial and Executive offices: 330 W. 42nd St., New York 18; 520 N. Michigan Ave., Chicago 11; 68 Post St., San Francisco 4; Aldwych House, London, W.C. 2; National Press Bldg., Washington 4, D. C.; Architects Bldg., 17th & Sansome Sts., Philadelphia 3; Hanna Bldg., Cleveland 15; 2980 Penobscot Bldg., Detroit 26; Continental Bldg., St. Louis 8; 1427 Statler Bldg., Boston 16; Rhodes-Haverty Bldg., Atlanta 3; 621 South Hope St., Los Angeles 14; 738-39 Oliver Bldg., Pittsburgh 22. JAMES H. McGRAW, Jr., President; CURTIS W. McGRAW, Vice-President and Treasurer; EUGENE DUFFIELD, Senior Vice-President, Publications Division; NELSON BOND, Vice-President and Director of Advertising; JOSEPH A. GERARDI, Secretary; J. F. BLACKBURN, Jr., Vice-President and Director of Circulation . . . Aviation Week, 330 W. 42nd St., New York 18. Published weekly, price 50¢ a copy, 50¢ in Canada. Allow at least ten days for change of address. Address all communications about subscriptions to Director of Circulation, 330 W. 42nd St., New York 18, N. Y. Subscription rates—United States and possessions, $6 a year, $9 for 2 yr., $12 for 3 yr. Canada, $7 for 1 yr., $11 for 2 yr., $14 for 3 yr., payable in Canadian currency at par. Pan American countries, $10 for one yr., $16 for 2 yr., $20 for 3 yr. All other countries, $20 for 1 yr., $30 for 2 yr., $40 for 3 yr. Please indicate position and company connection on all subscription orders. Entered as second class matter July 16, 1947, at Post Office, Albany, N. Y., under Act of March 3, 1879. Volume 51, Number 7. Printed in U.S.A. Cable address "McGraw-Hill New York." Member A.B.C.

Copyright, 1949, McGraw-Hill Publishing Co. Aviation Week is indexed in "Reader's Guide to Periodical Literature", "Engineering Index" and "Industrial Arts Index". Publications combined with AVIATION WEEK are AVIATION, AVIATION NEWS, AIR TRANSPORT, AERONAUTICAL ENGINEERING and AIRCRAFT JOURNAL. All rights to these names are reserved by McGraw-Hill Publishing Co.

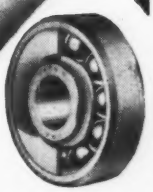
URGENT

FOR YOUR REFERENCE FILES

For easy identification this latest edition has a RED cover.

. . . includes all PLYA-SEAL BALL BEARINGS TO MEET SPECIFICATIONS AN.B-46

● Now . . . the whole line of Fafnir Aircraft Ball Bearings . . . all the sizes and series developed during and after the war . . . all the improvements including Plya-Seals . . . all completely described and cataloged for your convenience. Twelve pages of precise information arranged for fast, complete answers to any aircraft ball bearing requirement. Write today for your copy. The Fafnir Bearing Company, New Britain, Conn.



Fafnir standard aircraft ball bearing . . . standard width Notice groove in outer ring in which washer and split retaining ring are firmly held. Washer slides in groove on edge of inner ring to form perfect seal with minimum friction.

Flexible seal washer of synthetic rubber impregnated fabric . . . non-capillary and impervious to liquids, grease, oil, gasoline, water, steam and most solvents. Not affected by heat or cold. Does not age. Washers in service four years or more are still good as new.

Split retaining ring of stainless steel which secures washer firmly to outer ring of bearing. Easily removed with penknife for inspection, washing and re-greasing . . . and just as easily replaced. Causes no distortion of outer ring or race.

FAFNIR
BALL BEARINGS
for Aircraft

FOREMOST IN
SCIENTIFIC DEVELOPMENT

IN THE REALM OF FORGING DESIGN AND THE DEVELOPMENT OF PROPER GRAIN-FLOW, WYMAN-GORDON HAS ORIGINATED MANY FORGING DESIGNS, WHICH AT THE TIME OF THEIR DEVELOPMENT WERE CONSIDERED IMPOSSIBLE TO PRODUCE BY FORGING.

WYMAN-GORDON

ESTABLISHED 1883

FORGINGS OF ALUMINUM · MAGNESIUM · STEEL

WORCESTER, MASSACHUSETTS

HARVEY, ILLINOIS DETROIT, MICHIGAN

NEWS SIDELIGHTS

Jet Transport Rush

Some U. S. engineers wear an "I told you so" look these days as a result of the first flight of the de Havilland Comet jet airliner. Ready, and able to produce a jet transport any time during the past three or four years, these designers have been frustrated by economic factors, which have kept airframe companies from building a jet transport and airlines from buying it.

Now they expect a sudden rush of orders for such a transport with constant pressure for quick action and the old mad race to beat the competition into the air.

The "Big Four" companies in U. S. transport development are hastily dusting off plans for a closer look. Odds are on Convair as first in the air with a jet version of its Liner and Lockheed as first with a designed-for-the-purpose jet transport.

Jet Traffic Problem

Still unsolved is the problem of revising traffic at main airports for more efficient handling, so that jet transports will not be left "holding" at the airport of their destination, burning up vast quantities of fuel until they can be cleared to land. Means of clearing a jet transport to land, almost from the time of its takeoff, will be essential due to the higher speed and shorter time en route.

Thomas Will Not Run

Sen. Elmer Thomas (D., Okla.), chairman of the appropriations subcommittee on the armed services which clipped $800 million off this year's Air Force budget, will not seek re-election next year. First in line to fill the key post which will be vacated by Thomas is Sen. Richard Russell (D., Ga.), generally considered pro-Navy. Next is Sen. Pat McCarran (D., Nev.), a strong Air Force advocate. There is some speculation that Civil Aeronautics Board member Josh Lee, defeated for re-election to the Senate in 1942, may seek Thomas' seat. Political observers, however, predict the Democratic nomination will go to Rep. Mike Monroney (D., Okla.).

Super DC-3 Chances

Despite some tendency to sell the Super DC-3 program short, there is a growing feeling in industry quarters that the modernization program for the air transport workhorse has a rapidly brightening future. Much may depend on Eastern Airlines' acceptance or rejection of the Super DC-3 as twin-engine replacement for its present DC-3. It is expected that the flying prototype will be shown to Capt. Eddie Rickenbacker as soon as the Eastern president returns from his South American junket.

As one qualified but unbiased engineering observer puts it: "It's a lot easier to sell somebody a new set of tires for the automobile they have been using and like, than to sell them a new automobile of a different make. And there are more DC-3s and C-47s flying than any other transports."

Fact that the modernized DC-3 will meet the Civil Air Regulations Part 4b whereas the standard DC-3 will not, and the Dec. 31, 1953, deadline for meeting that requirement, are other factors in favor of the Super DC-3.

AMC Wings Clipped

Air Materiel Command, procurement agency for USAF, is losing more and more initiative and responsibility as unification of the National Military Establishment progresses, informed Washington observers say. Virtually all important policy decisions are now handed down from Munitions Board or USAF for execution by AMC.

With USAF policy pointing toward a new research center to place Wright Field engineering laboratories in an ultimate secondary position, and with trend to transfer maintenance of MATS and troop carrier command transports to civilian maintenance contractors from AMC depots (AVIATION WEEK, July 18) the AMC headquarters at Dayton is rapidly being de-emphasized in the total USAF program.

A Look at Lobbyists

Congress is set to turn the spotlight on the activities of Washington representatives. A resolution setting up a seven-member special committee to investigate congressional lobbying has been approved by the House Rules Committee.

The committee is expected to start functioning as soon as the session winds up, leading off with a scrutiny of the registrants under the 1946 lobby act which include over a score of aviation representatives. The current investigation of "five percenters" by the Senate Committee on Expenditures in Executive Departments is expected to result in legislation requiring representatives dealing with government agencies to register, as now required of those dealing with Congress. Sen. Homer Ferguson (R., Mich.), has already introduced a bill to accomplish this.

Noise Problem

Public ire against noise created by low-flying planes has again risen to a point where the airlines anticipate serious repercussions if corrective action isn't taken.

The New York area is a particularly sore spot, and investigations show that the public resentment is justified in a number of cases.

Some airline pilots have not followed traffic patterns established at LaGuardia, Idlewild and Newark Airports. CAA has on file over 200 alleged airline violations of traffic patterns in the New York metropolitan area and may take action in the future against individual pilots.

Newspapers in New York City, Northern New Jersey and Long Island have recently editorialized against the airplane noise nuisance. The airlines fear that if indignation mounts much further, municipalities and state governments may pass ordinances to prohibit flight over certain areas at any altitude —even though such action has doubtful legality.

Local airline representatives have been advised to start an active public relations program to meet with civic groups and municipal officials complaining against the noise problem and attempt to explain the difficulties involved. The airline representatives would assure the local groups that the carriers are actively at work to eliminate as much noise as possible through flight patterns that are consistent with safety.

Meanwhile, appraisal of engineering progress made since World War II toward reduction of noise emanating from large transport aircraft in flight shows that virtually all noise reduction engineering has been directed toward passenger comfort inside the plane, with little or no attention to quieting the outside noise from the plane.

OPERATION :
OPPORTUNITY
With versatility as co-pilot, wing ahead smoothly and efficiently with the greater AVITRUC— designed for the specific job of carrying increased tonnage economically and dependably.
A high performance carrier engineered to load bulky items without disassembly— it's the C-123, big brother of the C-122.
7786
Chase AIRCRAFT CO., Inc.
WEST TRENTON, NEW JERSEY
STROUKOFF AVITRUC

AVIATION CALENDAR

Aug. 21—All-state air show, Woodrum Field, Roanoke, Va.

Aug. 22-23—ARTC, western division meeting, Boeing plant, Seattle, Wash.

Aug. 23-26—American Institute of Electrical Engineers, Pacific general meeting, Fairmount Hotel, San Francisco.

Aug. 25-28—Flying Farmers national convention, Fort Collins, Colo.

Aug. 29-Sept. 1—Acromedical Assn., annual meeting, Statler Hotel, N. Y.

Sept. 1-7—International conference of Federation Aeronautique Internationale, Wade-Park Manor, Cleveland, Ohio.

Sept. 3-5—1949 National Air Races, Cleveland, Ohio.

Sept. 6-8—Annual spark plug and ignition conference, sponsored by Champion Spark Plug Co., Hotel Secor, Toledo, Ohio.

Sept. 7-11—10th Society of British Aircraft Constructors flying display and exhibition, Farnborough Airfield, Hampshire, England.

Sept. 9-12—Clinic on maintenance of industrial instruments, Instrument Society of America, Statler Hotel, St. Louis.

Sept. 11—Dedication, Quincy, Ill., municipal airport.

Sept. 14-15—82nd eastern division meeting of NASC, New York City.

Sept. 18-20—International Northwest Aviation Council convention, Spokane, Wash.

Sept. 22-23—ARC-CAA-CAB transport meeting on CAR 4b policies and interpretations, Hotel Statler, Washington, D. C.

Oct. 3-8—Twentieth anniversary meeting, Ninety-Nines, Waldorf-Astoria, New York.

Oct. 5-8—SAE national aeronautic meeting and aircraft engineering display, Biltmore Hotel, Los Angeles.

Oct. 7-8—American Air Mail Society exhibition and convention, Edgewater Beach Hotel, Chicago.

Oct. 12-15—Air Reserve Assn. convention, Long Beach, Calif.

Oct. 17—36th NASC steering committee meeting, Dayton, O.

Oct. 18-19—6th NAS council meeting, Wright-Patterson AFB, Dayton, O.

Oct. 30—Third annual San Francisco Air Fair, sponsored by Junior Chamber of Commerce, San Francisco Airport.

Oct. 30-Nov. 2—Annual convention, National Assn. of State Aviation Officials, New Orleans.

Nov. 9-11—Seventh annual meeting Aviation Distributors and Manufacturers Assn., French Lick Springs Hotel, French Lick, Ind.

Jan. 13-15, 1950—All-American Air Maneuvers, Miami.

PICTURE CREDITS

13—NME; 15—Northrop Aircraft, Inc.; 17—Curtiss-Wright Corp.; 51—Ankers; 55—United Air Lines.

NEWS DIGEST

DOMESTIC

Chance Vought workers in Dallas chose UAW-CIO as bargaining agent in an NLRB election. UAW-CIO received 2491 votes to 653 for the International Assn. of Machinists. Workers cast 718 votes against any union representation at all.

American Airlines has asked U. S. Circuit Court of Appeals for the District of Columbia to stay the Civil Aeronautics Board decision of Aug. 2 which granted five-year all-freight certificates to Slick Airways, the Flying Tiger Line, U. S. Airlines and Airnews, Inc. AA cited about 40 points on which it alleges CAB erred in its opinion.

Arthur M. Young, aviation engineer of New York City, was awarded the Edward Longstreth medal of the Franklin Institute for his "successful application of flying scale models to test unproven ideas in helicopter flight."

India will give its carriers about $5,100,000 in financial assistance as part of a program to encourage civil aviation.

Capital Airlines DC-3 collided in mid-air with a Cessna 140 over Maitland Field, Milwaukee, killing the sole occupant of the smaller ship. The airliner continued on to Mitchell Field, some six miles south, where it landed as scheduled. A six-foot section of the right wing-tip was ripped off.

Continental Air Lines' request to offer reduced family fares every day of the week instead of just Mondays, Tuesdays and Wednesdays, has been denied by CAB.

Return of Wright Brothers' plane from England to the United States will be commemorated by issuance of a 6-cent air mail stamp.

Wiggins Airways is studying the possibility of activating part of its certificated feeder system next month with single-engine Beech Bonanzas or twin-engine Cessnas. First service would be over segments between Boston and Albany and between Boston and Springfield, Mass. Company was certificated in June, 1946, and its three-year franchise is due to expire in December.

Douglas Super DC-3 will be the first commercial airplane completely equipped with a fire-resistant hydraulic fluid. Hydraulic system will be operated with Skydrol, developed jointly by Douglas and Monsanto Chemical Co.

National Airlines dismissal of First Pilot M. G. O'Neal, Jr., which precipitated the strike of ALPA pilots, was upheld in a decision rendered by I. L. Broadwin, an appointee of the National Mediation Board. O'Neal was dismissed in 1945 following an airline accident at Tampa, Fla. In 1948, the union voted to strike against the carrier to protest the fact that O'Neal had never been reinstated.

FINANCIAL

Air Associates, Inc., reported a loss for the quarter ended June 30, 1949, of $55,498, after a provision of $120,000 for possible loss on development contracts entered into during 1947. Sales for the quarter totaled $1,756,430 and for the nine months aggregated $4,829,755, as compared with $1,540,092 and $4,726,287 for the same periods a year ago. Profit for the quarter before provision for loss and federal taxes amounted to $55,372 as compared with a net profit of $3110 for the same period last year.

Lear, Inc., showed a net operating profit of $222,000 on sales of $3.7 million for the six months ended June 30, 1949. This compares with sales of $2,416,000 for first six months of 1948 and operating loss of $702,000 for full year of 1948. Unfilled order backlog at June 30 was $4.9 million with additional contracts of $2.5 million in the process of acceptance.

Menasco Manufacturing Co. reported operating profits of $352,228 from net sales and other income of $3,879,676 for the fiscal year ended June 30, 1949. Backlog was reported at approximately $4,110,000 on Aug. 1, of which 98 percent was for aircraft landing gears for major airframe companies. In the previous year, net profits were $14,515 from net sales and other income of $3,989,428.

INTERNATIONAL

Gloster Meteor was refueled ten times in flight from a tanker plane and remained aloft 12 hr. 3 min. Ordinarily, Britain's fastest standard jet fighter can remain in the air about an hour and one-half. Craft was reported to carry a tube in its nose which was directed by the pilot to a metal cone fastened to the tanker plane.

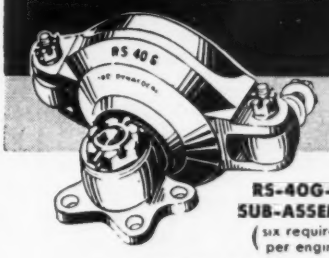
A Brazilian Varig airliner crashed enroute to Porto Alegre from Rio de Janeiro killing four passengers and one crew member and injuring 11 passengers and two of the crew. The craft caught fire a few minutes before reaching its destination.

British Overseas Airways Corp. this week plans to replace its Plymouth flying boats on the London-Hong Kong and London-Tokyo routes with Canadair-built Argonauts, 23 of which are on order by the carrier.

LORD

DYNAFOCALS

Greater Safety • Added Comfort



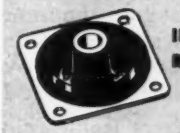
RS-40G-5A SUB-ASSEMBLY
(six required per engine)

For LOCKHEED "CONSTELLATION"
DOUGLAS AD-1 & AD-2
MARTIN "MARS" (JRM-1)
Using Wright R-3350-C18BB and C18BD engines

Lord Dynafocal engine mountings have kept pace with changes in engine design, to provide suspension systems which combine every possible safety feature with relaxed comfort for passengers and crew Scientific design and accurate stress analysis achieve minimum weight for required strength.

Write for a copy of Lord Service Bulletin containing valuable information on maintenance problems, suggestions for increased service life, and parts list. Mention engine or mounting in which you are interested.

COWL MOUNTS



INSTRUMENT PANELS, RADIO, NAVIGATION, COMMUNICATION EQUIPMENT

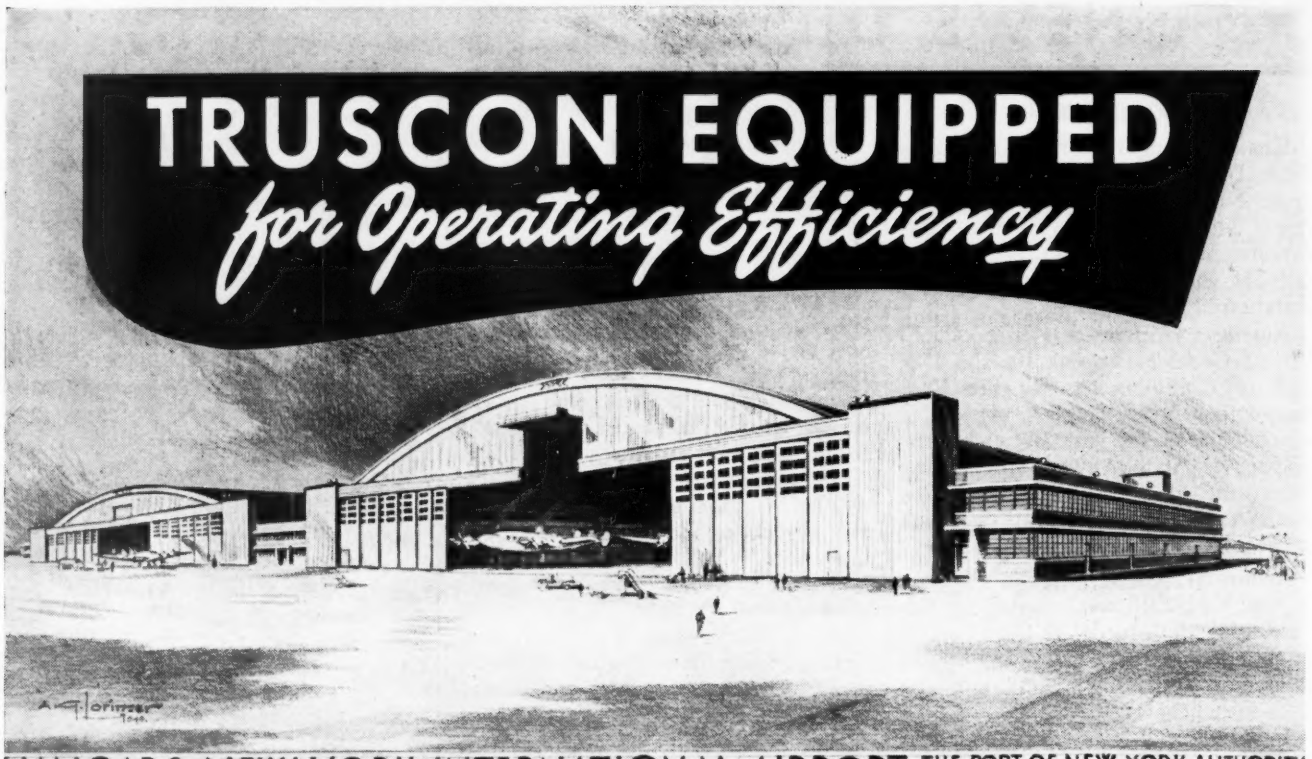
LORD MANUFACTURING CO
ERIE, PA.

Canadian Representative:
Railway & Power Engineering Corp. Ltd.

LORD

Vibration Control Systems

TRUSCON EQUIPPED *for Operating Efficiency*



HANGARS · NEW YORK INTERNATIONAL AIRPORT THE PORT OF NEW YORK AUTHORITY
ROBERTS & SCHAEFER COMPANY · ENGINEERS

New York International Airport, L. I., N. Y. Stock Construction Co., Contractor; Roberts & Schaefer, Consulting Engineers; Lorimer & Rose, Architects

The New York International Airport is the largest in the world. Its 4900 acres and ten miles of paved runways will be able to handle over 60 landings and take-offs per hour.

Traffic must move freely and quickly to handle this volume. Truscon Straight Slide Hangar Doors are used to expedite movement through six openings in the gigantic hangars. Each opening is 285 feet wide by 40 feet high, with a motor-operated Truscon Turnover Door above each opening of slide doors. These Turnover Doors are 34 feet wide by 24 feet high, and serve as tail gates.

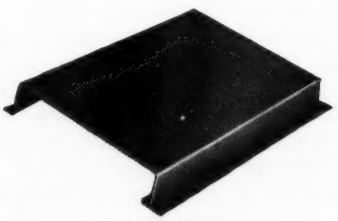
The Truscon Straight Slide Doors employ a traction drive in the lead leaf, with interconnecting cables between leaves. All controls are within the buildings. In case of power failure the doors can be operated manually with ease.

Truscon also furnished other important structural units in this mammoth airport. Truscon Architectural Projected Steel Windows permit the generous use of Nature's free sunlight and fresh air. Long life and low maintenance costs are assured by the sturdy steel construction of these attractive windows.

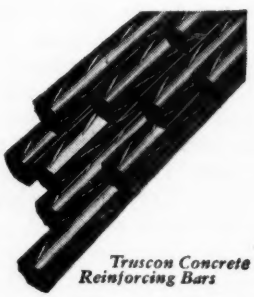
Truscon "Ferrobord" Steeldeck permitted the quick, economical installation of roofing on the immense buildings. "Ferrobord" Steeldeck consists of a parallel system of strong structural interlocking steel members, which present a smooth surface over which can be applied built-up roofing of any type, with or without insulation.

Truscon Concrete Reinforcing Bars were used in concrete slabs, columns, walls, footings, etc.

Truscon Architectural Projected Steel Window



Truscon "Ferrobord" Steeldeck



Truscon Concrete Reinforcing Bars

Write for descriptive literature showing the complete line of Truscon Steel Building Products especially adaptable to airport construction.

TRUSCON STEEL COMPANY
YOUNGSTOWN 1, OHIO
Subsidiary of Republic Steel Corporation
Warehouses and sales offices in principal cities

WHO'S WHERE

Douglas Aircraft Co. has advanced **L. E. Tollefson** from assistant secretary to secretary, succeeding **T. C. McMahon,** 20 years at the company, who has reached retirement.

Chief engineer of Jack & Heintz Precision Industries' aviation division is **Dwain E. Fritz,** formerly chief project engineer.

R. R. LaMotte has been named chief engineer for General Motors Corp.'s Aeroproducts division. Assistant chief engineer since March, 1947, he became acting chief engineer last January.

Dr. Luigi Crocco, jet propulsion and supersonic aerodynamics authority, has been appointed to the Princeton University faculty as Goddard professor, directing research at the Daniel and Florence Guggenheim Jet Propulsion Center at Princeton.

Charles Tindal Travers is superintendent of air regulations in the civil aviation division, Canadian Department of Transport, Ottawa. He succeeds **Stuart Graham,** who becomes official Canadian delegate to the Air Navigation Commission of ICAO.

Allan A. Barrie has been appointed manager of Transocean Air Lines' Atlantic division. He recently organized Trans-Pacific Air Lines' operations in the Hawaiian Islands.

At TEMCO, **H. G. Erickson** has been named chief engineer. **L. A. Childs, Jr.,** becomes assistant chief engineer.

Brig. Gen. E. H. Salsman (USMC, Ret.) has joined Minneapolis-Honeywell Regulator Co. as assistant director of the aeronautical division. Recent assignments with the Navy Dept. included rocket and guided missile development. He retired from active duty Aug. 1.

Stanley Washburn, Jr., has been named promotion director of Pan American Airways. He formerly held a similar post with American Airlines. . . PAA has appointed **William H. B. Ortwin** district traffic manager in Tokyo.

Northwest Airlines has transferred **B. J. Talbot,** formerly traffic manager-Philippines, to its eastern regional traffic staff in New York. He will work on development of cargo and passenger business to the Orient.

James Mitchell replaces **Harry E. Karst,** resigned, as Western Air Lines director of research. Mitchell was manager of traffic and sales control.

National Airlines has appointed **Walter Sternberg** as vice president-sales effective Sept. 6. He now is assistant v-p of American Airlines and formerly was general traffic manager of Eastern Air Lines. . . **Herbert C. Dobbs** has resigned as NAL traffic v-p and director.

OTHER CHANGES

S. H. Fedane, since 1941 manager of Koppers Co.'s Aeromatic propeller dept., has become assistant to the sales manager of the metal products division . . . **Charles W. Perelle** succeeds **Ronald R. Monroe,** resigned as president of ACF-Brill Motors Co. Monroe remains as consultant . . . **Walter Linder,** former executive v-p of Philippine Air Lines, is assistant general manager of Allied Van Lines.

INDUSTRY OBSERVER

► U. S. Air Force has not yet crystallized its fiscal 1950 aircraft procurement plans. Fairchild Board has been meeting in the Pentagon. Variety of plans have been drawn to fit the varying amounts of money that may be voted by the current Congress. Final plans probably won't be drawn until after the fiscal 1950 military appropriations bill is signed by the President.

► **Watch for some shifts in the USAF trainer procurement program. Fairchild which has a letter of intent for 100 T-31 trainers does not yet have a firm contract and may not get one. North American is now back in the picture with a "1950 version" of its old standby the AT-6 and Beech may still get a slice of the USAF pie with its T-34 Mentor trainer. TEMCO trainer has been designated the T-33 by the USAF but is not expected to figure in the procurement shifts.**

► Convair is now negotiating with the USAF on a contract to cover production of an additional 76 B-36 bombers. The new contract will be for the B-36Ds and conversion of the B-36A and B-36B models to include the four General Electric J-47 turbojets used in the B-36D.

► **Britains third turboprop airliner, the Mamba-powered Marathon built by Handley Page, has completed its first successful test flight. The Marathon powered by piston engines has been ordered by British European Airways as a feederliner of 18-22 passenger capacity. The turboprop version has a cruising speed of 260 mph. over a 500-mi. range with 5740 lb. payload.**

► Boeing has received a $1,199,464 contract from USAF for ten 25-ton bomb lifts and six 11-ton lifts designed for ground handling of the largest type aircraft bombs now available. Initial deliveries are scheduled next July with the contract supposed to be completed by next December.

► **Air Services of India has taken delivery of a French SO-95 twin engine 12-passenger feeder liner for test purposes on its network of short hauls fanning out from Bombay. The airline now operates 13 Douglas DC-3s and three De Havilland Rapides and carries about 4000 passengers monthly.**

► Canadian Car and Foundry Co. of Montreal is now working on a new 30-ton payload version of the Burnelli flying wing transport. Cancargo is hoping to interest USAF and RCAF in a troop and cargo carrying version of the big flying wing.

► **TEMCO, Texas Engineering & Mfg. Co., has two new subcontracts from Boeing Wichita division and Convair's Ft. Worth division. One is for tooling and fabrication of beam channels on the Boeing B-47. Convair contract calls for castings and forgings on the B-36.**

► McDonnell Banshees have replaced Phantoms in two Navy jet fighter squadrons based at Cecil Field, Jacksonville, Fla. The field has become one of the Navy's principal Atlantic Coast air bases building up from 21 men to over 2000 men and 200 planes during the last nine months.

► **Watch for new airline interest in the cross-wind landing gear as a result of CAA approval of 40 mph. crosswind component for the Douglas DC-3 transport if equipped with Goodyear swivelling wheels for crosswind landings. Recent tests made by a CAA DC-3 on the West Coast and a Goodyear DC-3 at Lubbock, Tex., under CAA supervision, are basis for the ruling. A Super DC-3 with crosswind gear would have a small field advantage difficult to match immediately by other twin engine transports.**

► First three Percival "Prentice" training planes assembled at the Indian government's Hindustan Aircraft Ltd. factory in Bangalore made their official first flights recently. HAL is to assemble 12 more from parts supplied by Percival Aircraft Ltd., Luton, England, before shifting over to manufacture of the two-seater 150-mph. craft. On the plant's books is an order for 50 for the RIAF.

In the SERVICE of AIR TRANSPORT

Licensed C-46 "Commando" parts manufacture and CAA Approved Conversion

CONVERSION-OVERHAUL-MAINTENANCE

American Airmotive's seal on your overhaul is your guarantee of improved operating efficiency and reduced maintenance costs. Our long list of satisfied customers proves our high standards of engineering and craftsmanship. Commercial operators save time and money when American Airmotive takes over their service problems.

FACILITIES - 400,000 feet of shop and storage space, fully equipped with the most modern precision machinery.

KNOW-HOW - 54% of our 385 shop personnel are certificated mechanics - almost 2½ times the percentage required by CAA.

SUPPLY - 691,000 different aircraft items for sale, new or overhauled. Fully indexed, instantly available.

We Are Prepared To Serve You *NOW*...

If your requirements necessitate overhaul and maintenance at your location, let us supply your replacement parts. We'll gladly give you the benefit of our installation and maintenance experience.

American Airmotive CORP.

MIAMI INTERNATIONAL AIRPORT

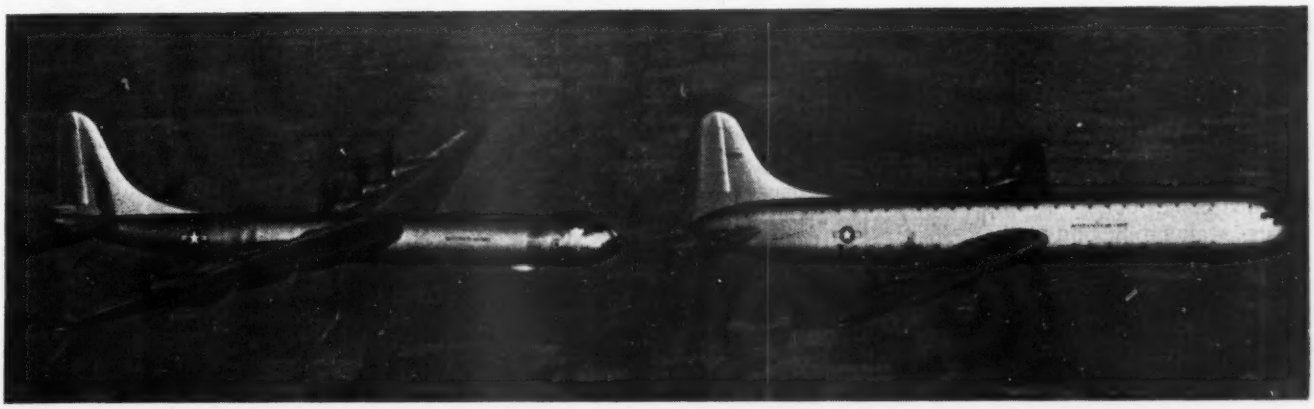
P. O. BOX 6, MIAMI SPRINGS, FLORIDA -- PHONE: 88-3445 • CABLE: AMAIRCO

WASH., D. C. OFFICE 1213 DUPONT CIRCLE BLDG.

Vol. 51, No. 7

AVIATION WEEK

Aug. 15, 1949



BIG PAIR. Air Force's XC-99 leads the B-36, from whose design it stemmed in a later and separate chapter of the B-36 story.

Why B-36 Was Made USAF Top Bomber

House investigators hear colorful history of plane since original contract in 1941.

By Robert Hotz

Convair's B-36 intercontinental bomber is the best all-purpose bomber now in production or available for production in the immediate future, according to USAF experts.

This evaluation is based on actual flight performance comparisons of the B 36, the Boeing B-50 and B-54 and the Northrop B-49 and was presented to the House Armed Services Committee by Maj. Gen. Frederic H. Smith, Jr., USAF deputy program director. Gen. Smith testified at the opening session of the House committee's investigation of USAF B-36 procurement policies and the role of airpower in the national defense structure.

According to Smith's testimony the USAF verdict in favor of the B-36 was based on the following findings:

• **B-36 proved to be faster** than the B-50 over the B-50's maximum range. In addition to the greater range offered by the B-36 it had a marked altitude advantage over the B-50.

• **B-36B performance** was demonstrated superior to the Boeing B-54 in every respect except speed over the target. The B-36D using jet assist is expected to be even faster than the B-54 over the target area.

• **B-36A performance** showed it to be superior to the Northrop RB-49 as a strategic reconnaissance plane due to range and stability. Gen. Smith said USAF experience indicated the RB-49 had tendencies to pitch and yaw making it unstable as a bombing platform and requiring an auto-pilot more sensitive than those now available. The B-49 has other shortcomings including lack of suitable armament positions and lack of early availability for production, he testified.

Final decision to continue with the B-36 program was made in Washington on June 25, 1948, by a council consisting of Air Force Secretary Symington; Brig. Gen. William D. Eckert, representing Undersecretary of the Air Force Arthur S. Barrows; Gen. Muir S. Fairchild, USAF vice-chief of staff; Maj. Gen. K. B. Wolfe, of the Air Materiel Command; Gen. Lauris Norstad, deputy chief of staff for operations; Maj. Gen. Donald Putt, then deputy chief of AMC engineering division; Maj. Gen. Grandison Gardner, chief of USAF aircraft requirements; and Gen. George Kenney, commander of the Strategic Air Command. At this decisive meeting Kenney and Norstad reversed their previous strong votes against the program.

► **Kenney's Views**—Gen. Kenney was the strongest and most persistent opponent of the B-36 during its post-war career according to Smith's testimony. Kenney originally favored the B-50 as the standard USAF heavy bomber with the Boeing six-jet B-47 as its eventual replacement. Kenney believed the development of built-in range for intercontinental bombers was technically impractical and that strategic bombing operations would always require the use of advanced bases within striking range of enemy targets or aerial refueling.

As late as January, 1948, Kenney's view on the technical unfeasibility of developing intercontinental bombers prevailed in the USAF top levels. At this time development on the Boeing B-52, then contemplated as a 500,000-lb. bomber was stopped and plans were made to modify B-36's coming off Convair's Ft. Worth production line as tankers for aerial refueling of B-50 and B-54 bombers. Kenney believed B-36 effective range would be only 6500 miles.

Principal factors in changing the B-36 picture between January and June of 1948, according to Gen. Smith, were:

• **Development of the envelope curve** as a new criterion of measuring bomber performance. This criterion placed primary emphasis on speed over maximum range and speed at various altitudes instead of the top speed, top altitude, and maximum range characteristics formerly used. Smith said the envelope curve presented a more realistic picture on an aircraft's performance.

• **Extremely favorable progress** of the B-36 flight test program. Both the B-36A and B-36B in their early flight tests indicated that the anticipated flaws in the B-36 performance could be overcome and that eventual performance possibilities looked much better than previously anticipated. In addition, production progress at Ft. Worth dispelled earlier doubts as to feasibility of large scale production of the B-36.

• **Deterioration of the international situation** that eventually resulted in the Russian blockade of Berlin in June, 1948. The requirement for a force of intercontinental bombers in being ready for immediate action became more acute as Russia's foreign policy became more aggressive. This influenced the air staff to concentrate on production of available models rather than bank on research progress that might produce superior planes in the future.

Other highlights of Gen. Smith's testimony were:

• **Convair-Northrop merger** was originally proposed by Floyd B. Odlum at a meeting including Air Secretary W. Stuart Symington; John A. McCone, member of the President's Air Policy Commission and a special adviser to Defense Secretary Forrestal; Odlum; and John Northrop at McCone's Los Angeles home, July 16, 1948.

USAF made no objections to the merger but John Northrop objected strongly. USAF had already indicated that it planned to produce the Northrop B-49 at the government-owned plant operated by Convair at Ft. Worth after completion of the B-36 program. Eventually a fee arrangement was worked out between Northrop and Convair on the B-49 program to enable USAF to combine the Ft. Worth production facilities with Northrop's engineering skill on flying wing types. Later the Ft. Worth B-49 program was cancelled clearing production facilities for more B-36s.

• **Flying Wing production program** called for three strategic reconnaissance versions of the B-49 jet-powered wing. The first version for which a production order of 30 was given out of fiscal 1949 USAF funds was to be powered by eight Allison J-35 turbojets. Range of this version was not sufficient to meet USAF strategic reconnaissance requirement.

Second version using more powerful jets was expected to be available in 1951 but was also expected to be outclassed by newer versions of the Boeing B-47, swept-wing six-jet bomber. The third version, powered by turboprops, was not expected to be available before 1952-53 and then was expected to be inferior to the turboprop-powered Boeing B-52. The B-49 was shifted from bomber to reconnaissance plane status after flight tests indicated the current version was too unstable for a bombing platform.

• **USAF severely criticized management** of Convair's Ft. Worth plant in the immediate post-war period and repeatedly

B-36 Time Table

April, 1941—10,000-mi. range, 10,000-lb. bomb load requirements set for very long range intercontinental bomber.

Oct. 16, 1941—Convair wins design competition over Boeing and Douglas and gets contract for XB-36.

June 19, 1943—Gen. H. H. Arnold, chief of Army Air Forces directs procurement of 100 B-36 bombers.

July 23, 1943—Convair signs letter of intent to build 100 B-36s.

July 15, 1944—Convair directed to speed up B-32 production program at expense of B-36 program.

Aug. 19, 1944—Undersecretary of War approved firm procurement contract for 100 B-36s to replace initial letter of intent.

Aug. 9, 1945—Air staff conference on post-war Air Force recommends four groups of B-36s mobile task force in post-war 70-group Air Force and approves continuing B-36 production program.

Aug. 8, 1946—First flight of XB-36 at Ft. Worth.

Dec. 12, 1946—First post-war evaluation of B-36 program at Gen. George Kenney's request. Kenney's suggestion for a cutback rejected by Air Materiel Command and General Spaatz.

March, 1947—Proposal by Convair for the B-36C using a Pratt & Whitney VDT power plant tractor installation aimed at increasing top speed to 410 mph., service ceiling to 45,000 ft.

Aug. 14, 1947—XB-36 reaches altitude of 38,000 ft.

Aug. 19, 1947—U. S. Air Force Aircraft and Weapons Board evaluates B-36 program and decides to continue production program of 100 B-36s with Boeing B-52 designated as eventual B-36 replacement.

Aug. 30, 1947—YB-36A first production model flown to Wright Field for static tests.

Sept. 4, 1947—B-36C program suggested to Air Staff by converting last 34 of 100-plane program to VDT-tractor versions. Increased costs of B-36C program to be met by cutting total program back from 100 to 95 planes.

Oct. 16, 1947—USAF Aircraft and Weapons Board approves B-36C program with Gen. Kenney making only dissent. Kenney urges B-36 use as aerial tanker, reconnaissance and anti-submarine sea search.

Dec. 4, 1947—YB-36 makes first flight.

Dec. 5, 1947—USAF approves B-36C program.

Dec. 14, 1947—YB-36 passes 40,000 ft. altitude on third flight.

April 8-9, 1948—First long range B-36A flight—32 hr., 6922 mi., 10,000 lb. bombs dropped halfway, two engines out during most of flight.

April 24, 1948—Air Staff recommends cancellation of VDT program due to cooling problems in engine above 40,000 ft., and cutback of B-36 program to 61 planes.

Sept. 2, 1948—Inspector General completes investigation of B-36 program.

May 13-14, 1948—B-36B makes 36-hr. flight of 8062 mi. with one engine out most of time. Carries 10,000 lb. bombs halfway.

May 21, 1948—Conference of top USAF officials in Mr. Symington's office decides to continue B-36 production program at least through 61 planes but cancels B-36C VDT program.

June 25, 1948—Air Staff decides to continue full B-36 production program.

June 30, 1948—B-36A drops 72,000-lb. bomb load.

June 29, 1948—B-36B drops 84,000-lb. bomb load; one 42,000-lb. bomb from 35,000 ft., and another from 40,000 ft.

July 18-19, 1947—B-36A flies 6000-mi. mission (maximum B-50 range) averaging 301 mph.—faster than B-50 average speed.

Aug. 23, 1948—B-36B reaches 41,250 ft.

Oct. 29, 1948—YB-36 reaches 43,150 ft. altitude.

Nov., 1948—USAF Reconnaissance Committee recommends B-36 over B-49 strategic reconnaissance plane.

Dec. 5, 1948—B-36B flies 4275 mi. above 40,000 ft. at average speed of 303 mph.

Dec. 7-8, 1948—B-36B flies 8200-mi. nonstop Ft. Worth-Hawaii mission dropping 10,000 lb. bombs at halfway mark.

Dec. 9, 1948—YB-36 reaches altitude of 46,100 ft.

Dec. 12, 1948—B-36B flies 4406 mi. mission above 40,000 ft. averaging 319 mph.

June 14, 1949—B-36D prototype authorized with four jet engines slung in underwing pod nacelles in addition to six P&W R4360-41 engines.

demanded management changes to speed up production of the B-36. USAF also found evidence that inferior material had been used by Convair production personnel on the XB-36. Strong action was taken to tighten what USAF termed a "faulty inspection system" due to both USAF Ft. Worth field office and Convair's local management. After La Motte T. Cohu succeeded Harry Woodhead as president of Convair extensive management shifts were made at Ft. Worth.

• **Complete failure** of the attempt to mate the Pratt & Whitney VDT power plant based on the R4360 piston engine to the B-36 airframe. This version designated the B-36C would have used tractor propellers instead of the pushers now used. It was originally expected to boost performance to 410 mph. top speed and 45,000 ft. altitude but insurmountable cooling problems encountered above 40,000 ft. in altitude chamber tests forced project cancellation.

• **Sharp conflict** between Strategic Air Command and Air Materiel Command over continuing the B-36 program. Gen. George Kenney, then SAC commander, maintained a consistently low opinion of the B-36 prospects while Lieut. Gen. Nathan Twining, then AMC commander, urged Kenney to string along with the B-36 since in its early stages it had fewer bugs than either the Boeing B-17 or B-29 at comparable stages in development. USAF chief of staff Carl Spaatz supported Twining's contention.

• **Development of the B-36D**, using four-jet engines in addition to the six P&W R-4360-41 piston engines was aimed primarily at increasing speed over the target area as a defensive measure.

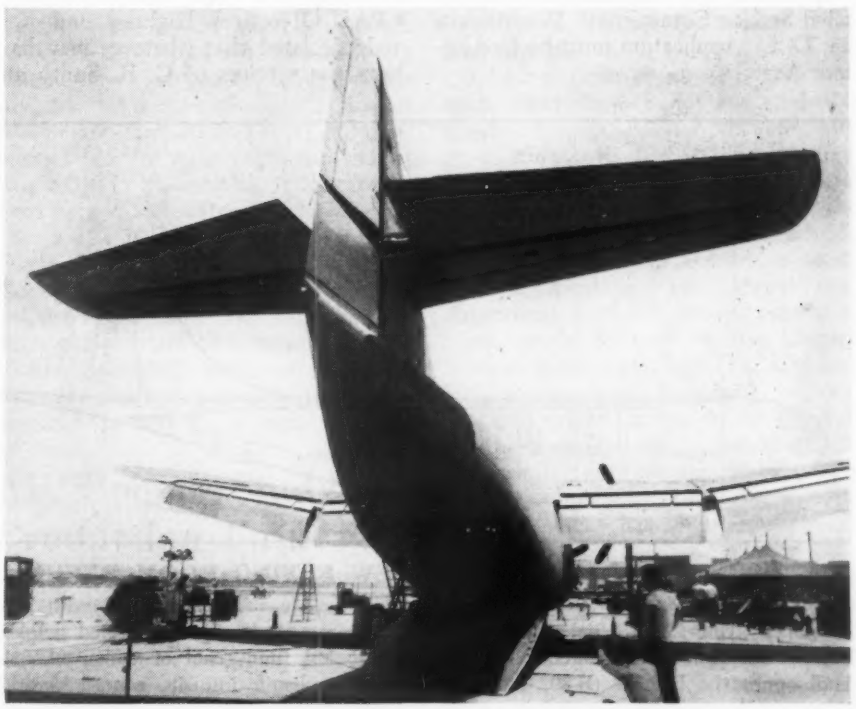
▶ **Lovett Testifies**—Supplementing Gen. Smith's detailed history of B-36 development was testimony by Robert Lovett, assistant secretary of war for air from 1941-45. Lovett testified the B-36 won a design competition in August of 1941 to meet an Army Air Force requirement for an intercontinental bomber capable of carrying 10,000 lb. of bombs on a 10,000-mi. mission. Maj. Reuben Fleet was president and principal stockholder of Consolidated Aircraft Corp. at the time the B-36 won the competition over Douglas and Boeing designs. Northrop was also asked to submit a Flying Wing design in the competition but no further action was taken on the Northrop proposal at that time.

Lovett testified at the time Consolidated won the B-36 competition he had not heard of Floyd Odlum or Victor Emanuel and as far as he knew there was no political or financial consideration in award of the contract.

Initial production contract for 100 B-36s was awarded on cost plus fixed fee basis in June of 1943 after the Trident conference in Washington indicated that there was little hope of conducting strategic bombing of Japan

Raider Makes Debut

First photos of initial production model Northrop C-125 Raider three-engined transport for USAF show craft taking off at Hawthorne, Calif., on beginning of accelerated test program, and also point up large-span double slotted flaps and huge under-fuselage loading ramp. Noteworthy in top photo are large dihedral angle and dual tail wheels. The big rear loading space admits vehicles up to 6½ ft. high, 9 ft. wide, and 24 ft. long. Military payload is stated to be five tons. Modified tail features split rudder. A total of 23 Raiders are on order—13 as assault transports which will act in lieu of gliders in establishing airheads, and 10 to be assigned for Arctic rescue missions. Northrop has licensed Canadair, Ltd., of Montreal, to manufacture the Raider for the international market. The craft's rugged design and ability to operate from short, unimproved flight strips is said to have created interest in the plane by feederline and bush freight operators. Special features include provision for easy maintenance, including a hinged leading edge, giving easy access to control cables.



from Chinese bases within B-17 or B-29 range.

On this assumption the requirement for the very long range bomber again became acute in plans for strategic bombing of Japan. After capture of the Mariana Island bases brought the B-29 within range of Japan AAF ordered Convair to shift priority from the B-36 to the B-32, a bomber roughly equivalent to the B-29.

▶ **Ready for Action**—Lovett said that although he had no detailed knowledge of the post-war B-36 program he was firmly convinced of the need of having a force of intercontinental bombers ready for instant action and warned against trying to fight a war with the airplanes still on the drawing boards instead of those on the production lines.

Gen. Smith said the first post-war evaluation of the B-36 program occurred just after V-E Day at which time the Air Staff recommended a force of four B-36 bomber groups as a mobile task force in the 70-group post war Air Force capable of immediate operations from North American bases against any potential enemy.

Inspectors Wanted

An examination for Air Force procurement inspectors has been announced by the Board of the U. S. Civil Service Examiners, Wright Field.

Procurement inspectors are wanted for aircraft, engines, instruments, aircraft materials and equipment, textiles, propellers, tools and gages, radio and electronic equipment, fuels and lubricants, and materials and processes.

Application forms may be obtained from first- and second-class post offices, civil service regional offices or U. S. Civil Service Commission, Washington 25, D. C. Application must be filed before Aug. 16.

PAA Merger Aims Held 'Fantasy'

Public counsel declares PAA has renewed 'chosen instrument' ambitions, plans to drive TWA out.

Blistering criticism of Pan American Airways' proposed purchase of American Overseas Airlines—and a strong recommendation that the deal be disapproved—was made by Civil Aeronautics Board public counsel.

"The chips are down in this case on the issue of monopoly," Public Counsel James L. Highsaw, Jr., and William F. Kennedy declared. "Acquisition of AOA would not in itself make Pan American a chosen instrument—not quite. But the record proves it would be a long and probably fatal step in that direction."

▶ **Certificate Revisions**—If Pan American's purchase of AOA (for about $19 million in PAA stock) is approved, the CAB attorneys continued, the public interest requires other important changes in North Atlantic certificates. These revisions, proposed by public counsel during hearings last spring, would make PAA's permanent North Atlantic operating rights temporary; would sever that carrier's round-the-world link; and would give TWA additional overseas traffic points so that a "competitive balance" can be maintained.

PAA president Juan Trippe already has stated that his company could not "under any circumstances" accept the conditions which public counsel wants to attach to the merger. Trippe said the conditions would have the effect of chopping "both legs and one arm off of us and turning them over to TWA."

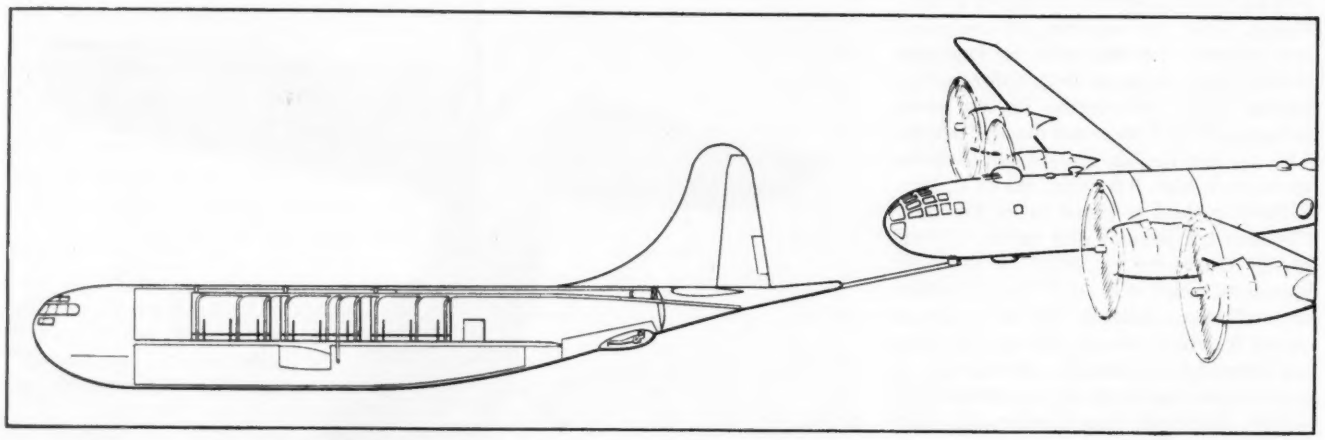
▶ **PAA Objectives**—Highsaw and Kennedy declared that whatever may have been the motives of C. R. Smith and American Airlines' board of directors in selling AOA, the record is clear that insofar as Pan American and Juan Trippe are concerned the deal "is merely one phase of a relentless drive to establish a private empire controlling a strategic sector of our national life."

The attorneys said the question to be decided is whether the President and CAB should reverse the policy of competition between American-flag carriers abroad which is embodied in the Civil Aeronautics Act and which Congress, in spite of repeated urgings, has refused to modify.

▶ **Ethics Questioned**—North Atlantic air routes are vital to the U. S. economic and political welfare, public counsel's brief emphasized. "To lodge control of all American-flag operations over these routes in the hands of Pan American and Mr. Trippe is to place U. S. policy and interests in the hands of a company and an individual who in the past placed their private interests above the declared policy of their government."

In an effort to prove that Pan American has acted counter to U. S. policy, public counsel cited letters from a PAA official purporting to show that shortly after Pearl Harbor the company resisted requests for more schedules in Latin America because it feared such a move would disclose existence of crews and equipment "which might be taken away from us to meet greater emergencies elsewhere."

Thus, at a time when the nation faced one of its gravest crises, PAA was withholding from the government full information on its resources of men and



BOEING'S NEW FLYING BOOM REFUELING SYSTEM

Artists sketch showing how the new Boeing-developed flying boom aerial refueling system works. The tanker aircraft (C-97A) hooks onto the bomber (B-50) by means of a flexible tail boom fitted with aerodynamic controls. Spotter located in plexiglas bubble under tail of tanker flies the refueling boom into its contact position with the bomber. Fast fuel transfer is possible through use of pressure pumps replacing gravity feed on current refuelling equipment used by USAF.

equipment, the brief asserted. "How, in the face of this conduct can serious consideration be given to entrusting Pan American with sole responsibility for American-flag service to Frankfurt and Berlin, and to areas such as Scandinavia which would be the first to feel the weight of a new totalitarian aggression?"

▶ **Defiance Seen**—To allow Pan American to have a monopoly of all American-flag operations abroad would be to create a dual sovereignty dealing at arm's length with the U. S. government and defying the government when it suited company interests to do so, public counsel charged.

"Acquisition of American Overseas by Pan American would create a substantial danger that PAA would be left in sole possession of the North Atlantic within a fairly short period of time, because TWA (with its weak financial situation) may be compelled to withdraw," the brief continued. "Once the AOA purchase is completed, PAA can be expected to embark on a determined and ruthless campaign to drive TWA out of the North Atlantic."

Public counsel accused Pan American of conducting a long-range systematic campaign to establish complete control of all American-flag international air transportation by acquiring other strategically-located carriers and eliminating or reducing competition with other companies by dividing territory. In trying to impede its competitors' operations, PAA allegedly "attempted to influence foreign governments with respect to granting landing rights to American-flag rivals; obtained exclusive concessions or landing rights; denied competitors use of Pan Am facilities; and opposed mail pay appropriations for American-flag rivals."

Plan Four-Engine Channel-Wing Plane

A newly-disclosed Parks College project to build a channel-wing airplane calls for expenditure of approximately $500,000 for a four-engine aircraft along principles developed by Willard R. Custer, Hagerstown inventor.

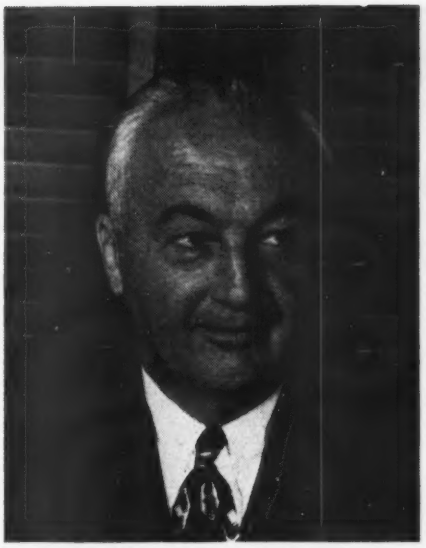
Custer told AVIATION WEEK that it was decided to make the Parks project a four-engine plane because of the additional safety factor in event of engine failure. His present flying test bed, for proving an improved design of wing channel (AVIATION WEEK, July 19, 1948) and his earlier channel-wing craft (AVIATION WEEK, Sept. 15, 1947) both were twin-engine craft. Problem of single-engine performance on these aircraft has always been one of the first questions raised by spectators at demonstrations.

Work is expected to start this month at the East St. Louis, Ill., aviation school, on the new craft. Custer will be chief engineering consultant on the project.

Both Custer and Dean Niels C. Beck of the Parks College of Aeronautical Technology who negotiated the contract for the project, expect that the four-engine craft will be able to take off from a standstill, land with "little or no roll" and to hover in mid-air because of its unique channel-wing design. Propellers at rear of channels draw air through the channels thus creating lift over the channel surfaces.

Oliver L. Parks, founder of the school, now a part of St. Louis University, has been a proponent of smaller four-engine aircraft because of their safety factor for some years, and sought to get such a plane to use on his feeder lines immediately after World War II. Proposal is now up for merger of the inactive Parks feeder lines with Mid-Continent Airlines.

Custer said the Parks-built channel-wing plane would be a completely finished "beautiful, sleek, streamlined" airplane, and not a stripped-down version like the two earlier craft.



NEW C-W PRESIDENT

Roy T. Hurley, former director of manufacturing engineering for Ford Motor Co., has been named president and a director of the Curtiss-Wright Corp., as management apparently points toward increased emphasis on production of non-aviation products. Before joining Ford, Hurley was vice president-manufacturing for Bendix Aviation Corp.

AF, Boeing Study Production Future

Air Force and Boeing Airplane Co. are wondering what will happen to the 25,000 employes in the Seattle area when production drops. So Air Secretary W. Stuart Symington and other top Air Force officials will fly to Seattle late this month to discuss this problem with Boeing, which recently announced it anticipates a "substantial" decline in Seattle plant employment.

Boeing's trouble stems from the cancellation earlier this year of the B-54 contract which "would have constituted the principal production at the Seattle division commencing in 1950," said William M. Allen, company president.

▶ **Tapering Off**—The Seattle and Renton plants now employ about 25,000 persons. No indication has been given as to how much this figure will shrink, although it is known Boeing has declared it cannot operate efficiently with a work force of less than 10,000.

Seattle fears Air Force pressure on Boeing to concentrate its major production in Wichita, Kan., where the B-47 already is produced.

Boeing, in its financial report for the first half of 1949, posted a profit of $662,349 after writing off a loss of $5.9 million on Stratocruiser production. Total Stratocruiser loss is placed at $15.4 million of which $13.1 million has now been written off.

The first six months of this year saw the delivery of 63 B-50s with 203 still on order, and 13 Stratocruisers, with 42 still on order. Sales amounted to $110,825,138. Backlog is listed at $359,028,203.

Chase to Move?

To the chagrin of the New Jersey State government, rapidly-growing Chase Aircraft Co. is being strongly urged by the Connecticut State government to leave its cramped quarters at Trenton and move into the multi-million dollar plant formerly occupied by Chance Vought Aircraft at Stratford, Conn.

Chase executives already have met with Connecticut's governor Chester Bowles, Senator Brien McMahon, and other officials to discuss the offer.

Main reason Connecticut is anxious to lure Chase away from New Jersey is that a move by the aircraft firm to Stratford would help alleviate a major unemployment problem in that area. An estimated 19,500 persons are out of work, partly because of the Chance Vought move to Dallas, Tex. CV had 8000 persons on its payroll.

Chase says it has made no decision on the proposed move, but a spokesman pointed out that the company does need more space.

Employment has about doubled in less than a year and now is more than 1000. This figure is expected to increase greatly when production is started on the 67 troop-carrying YC-123 assault transport (AVIATION WEEK, Jan. 17).

FINANCIAL

Air Shares Up Value of Trust Folios

Large investment trusts are improving their aviation holdings because of favorable rises in these issues.

Aviation shares are restoring or increasing values wherever held in investment trust portfolios. This is indicated in a preliminary examination of mid-year reports now being released. It is highly significant that rising market prices for many aviation issues since June 30, 1949, have imparted even greater values than that shown at the record date.

National Aviation Corp. remains the largest investment trust devoted exclusively to aviation commitments, making its periodic shifts of particular interest.

▶**Assets Climb**—As of June 30, 1949, its net assets were valued at $6,641,872 or $14.88 per share. This represents a reversal of a declining trend in net asset values which had been in process since Dec. 31, 1945. At that point, with no allowance for $2.25 in dividends paid during 1945, net assets aggregated $29.81 per share. The low point was reached at Dec. 31, 1948, when the per share valuation stood at $14.76.

During the first six months of 1949, National Aviation's net ordinary income amounted to $152,178 as compared with only $57,410 for the same period in 1948. However, losses from the sale of securities during the current period aggregated $61,938 and was an improvement over the $138,442 lost in the same process for the first six months of 1948.

It is noteworthy that little change in the overall composition of the trust's industry participation was effected from Dec. 31, 1948 to June 30, 1949. As of the later date, aircraft and accessories comprised 47.5 percent of the total portfolio, airlines accounted for 34.3 percent and cash, U. S. securities amounted to 18.2 percent.

During the first six months of this year, National Aviation liquidated 4800 shares of Boeing. A total of 2000 shares of Thompson Products were also sold. Curtiss-Wright "A" commitments were reduced by 200 shares. Also, 500 shares of United Aircraft preferred were disposed of.

Offsetting these sales were a series of purchases in the aircraft group. Such acquisitions included an additional 7100 shares of Curtiss-Wright common, 900 Douglas, 3000 Lockheed, 1700 United Aircraft common and 200 Greer Hydraulics preferred.

▶**Airlines to Industry**—The trust was also active in the airline group and effected a number of significant transfers. A total of 5000 shares of Northwest Airlines preferred were liquidated, cutting the previous commitment of 10,000 shares in half. It appears that this transaction accounted for the bulk of the trust's loss on sale of securities for the current six months. The company's former holdings of 12,000 shares of Pan American Airways were completely disposed of, mostly during the second quarter of this year.

The proceeds from these sales were applied toward the purchase of an additional 10,000 shares of American Airlines common, bringing total holdings in this issue up to 20,000. Another 400 shares of AA preferred were also purchased making a total commitment of 11,300 shares in this senior equity.

Giving effect to all of the above transfers, National Aviation's June 30, 1949, portfolio comprised the following: Aircrafts: 21,000 Bell, 5000 Bendix, 5200 Boeing, 17,100 Curtiss-Wright common, 4800 Curtiss-Wright "A", 8600 Douglas, 1000 Greer Hydraulics preferred, 20,000 Grumman, 18,000 Lockheed, 35,500 North American, 5000 Sperry, 5000 Thompson Products, 17,700 United Aircraft common and 1500 United Aircraft preferred.

Airlines: 10,000 Air Express International Agency common, 20,000 American Airlines common, 11,300 American Airlines preferred, 13,500 Braniff, 5000 Chicago & Southern common, 10,000 Chicago & Southern VTC, 14,500 Delta, 40,000 Eastern, 5000 Northwest preferred and 5010 United preferred.

Total indicated cost of the portfolio of National Aviation amounted to $6,074,361. Market values at June 30, 1949, however, were only $5,410,120. The largest individual holding was in American Airlines preferred with a June 30, 1949, market valuation of $714,725 against a cost of $948,668. The second largest commitment as of the same date was represented by 40,000 shares of Eastern with a market valuation of $555,000 against a cost of $449,903.

▶**Covering the Field**—Specialized aviation trusts are also present as individual funds under a broad group of investment companies sponsored by professional managers. One such large fund comprises the aviation shares of Group Securities, Inc. This fund's net assets aggregated $2,328,939 as of May 31, 1949. A year earlier, assets were considerably higher at $3,500,791. It appears that this group attempts to diversify very broadly without any serious effort to carefully discriminate among issues for special factors. In this manner, it may be assumed that a broad representation in the industry is obtained.

Group Securities aviation fund as of May 31, 1949, consisted of the following portfolio: 17,000 American Airlines common, 6500 Beech, 2500 Bell, 4500 Boeing, 11,500 Braniff, 4500 Cessna, 10,000 Consolidated Vultee, 7000 Curtiss-Wright "A", 2500 Douglas, 3500 Eastern, 200 Fairchild Camera, 15,000 Fairchild Engine and Airplane, 8000 Grumman, 10,000 Lockheed, 9800 National Airlines, 15,000 North American Aviation, 10,000 Northwest Airlines, 15,000 Pan American Airways, 20,000 Piper, 10,500 Republic, 6000 Sperry, 7600 United Aircraft and 9000 United Airlines. This group made important additions in its holdings of Convair, Northwest Airlines, Curtiss-Wright "A", Braniff, Fairchild Engine, Eastern, and Grumman. Reductions were made in investments in Bell, Boeing, Douglas, Fairchild Camera, Lockheed, and National Airlines.

Among the general type investment trusts there does not appear, as yet, any appreciable interest in aviation shares.

American and Eastern appear to rank among the favorite airline holdings of general investment trusts making air transport commitments. There is no such clear cut preference among the aircraft builders.

▶**Diversified Views**—It is apparent that frequently conflicting views prevail among investment trust managers. For example, while one fund may be selling blocks of an airline security, another trust may be buying the same issue.

To many supporters of the aviation industries, it is disappointing that general investment trusts, with their increasing reservoirs of capital, have not seen fit to make increasing commitments in airline and aircraft shares. If any widespread trend in this direction ever took place, the aviation groups would have access to a major source of capital which could finance needed growth and expansion.

All too frequently, however, investment trusts, particularly those who have previously been hurt by past aviation commitments, await the elimination of most of the risks in any given situation before making a new investment. Such delay, while it assures insurance against any loss also precludes an opportunity for substantial profit.

—Selig Altschul

Parker Precision Adds Power to Jets

- DUPLEX INJECTION NOZZLES
- INJECTION MANIFOLD DUMP VALVE
- STOP-COCKS
- AN FITTINGS
- 600 psi FUEL CHECK VALVE
- SPECIAL FITTINGS
- HOT-AIR SHUT-OFF VALVES
- HIGH-PRESSURE FUEL SHUT-OFF VALVES
- FUEL FILTERS AND ELEMENTS

Take a jet engine down and you'll find many parts made by PARKER. These parts are precision-machined, accurate in the minutest detail, to fit perfectly into the intricate, "clock-like", "jewel-like" mechanism of jet engines. Nine of them are spotlighted at the left.

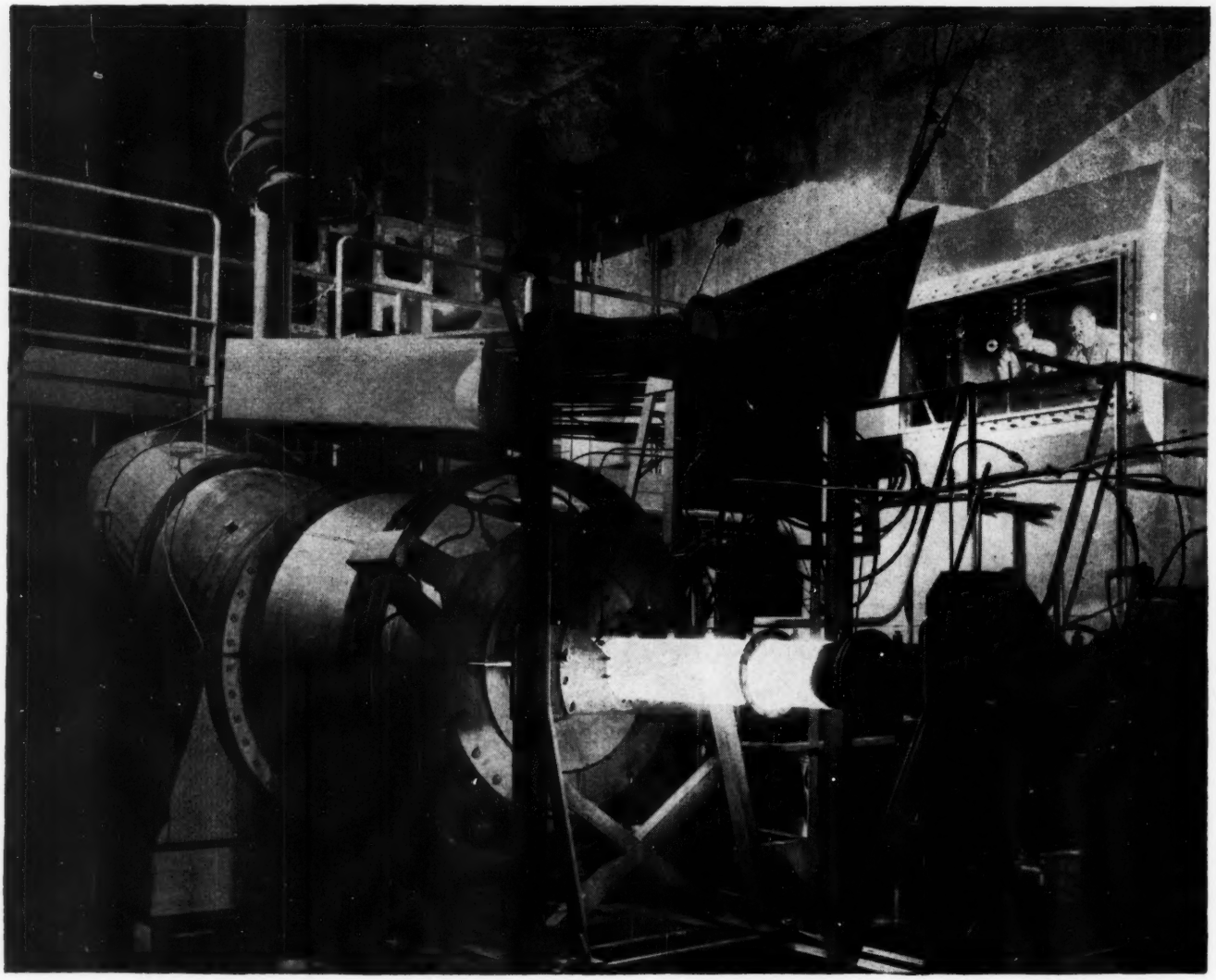
Manufacturers are turning to PARKER more and more frequently for vital new parts such as special valves and related components for aircraft fuel and hydraulic systems. The reason is to be found in the skills and know-how of PARKER craftsmen . . . skills and know-how that are so necessary to produce work of the extreme accuracy and tolerances demanded by jet engines. They are skills and know-how that perhaps can solve a troublesome problem for you.

Complete information on PARKER valves and fittings that have long been accepted as the aircraft industry's standard, is contained in the new PARKER Catalog 501.

Parker

TUBE FITTINGS • VALVES

PARKER APPLIANCE COMPANY
17325 EUCLID AVENUE, CLEVELAND 12, OHIO
5827 WEST CENTURY BLVD., LOS ANGELES 43, CAL.



LOOKOUT FOR A BLOW OUT...

▶ These research engineers are on the "lookout" . . . for a burner blow out as they test a *white hot* scale model of a ram jet combustion chamber under development in Wright Aeronautical laboratories.

▶ It's a *precision* test . . . the test rig simulates conditions that a combustion system encounters in a ram jet operating at supersonic speed.

▶ Research like this advances the efficiency of the ram jet. It guides the engineer to the *best* combustion chamber design for eliminating flame blow out and bringing maximum combustion and operating stability to ram jets . . . the *flying furnaces* of modern aviation.

▶ To simulate high speed operation up to 2000 mph at altitudes up to 60,000 feet . . . air is forced in by huge blowers heated to 640°F to duplicate compression heat that results from ram. At this stage fuel is injected at high pressures and the fuel-air mixture ignited. The exhaust products are then evacuated at *hurricane* force by steam ejectors to produce low pressures encountered at high altitudes.

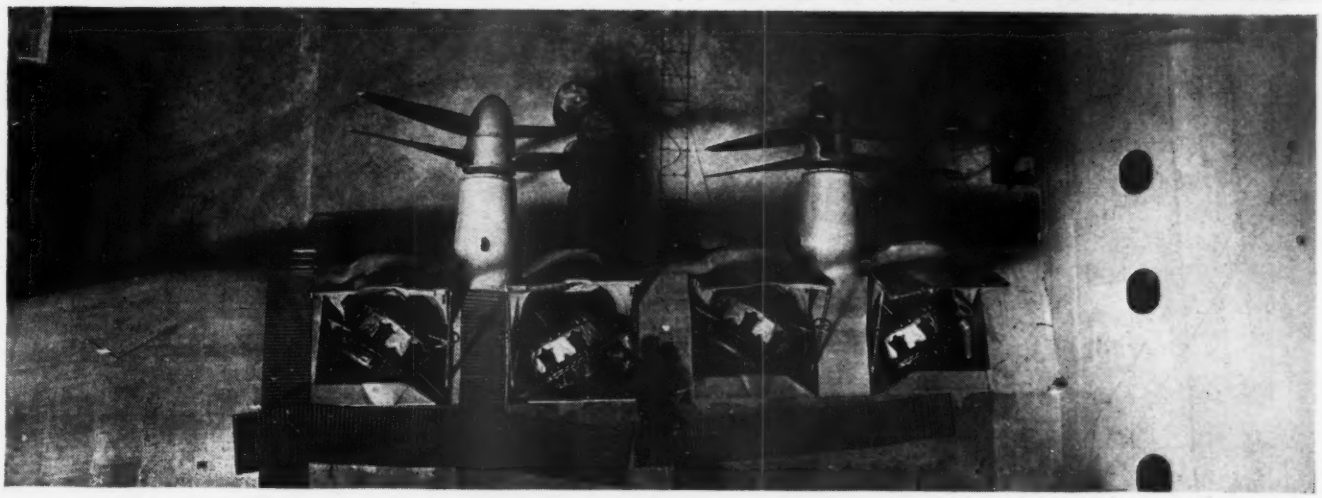
▶ Ram jet combustion research is one of many ways in which Wright Aeronautical is conducting the development of future type power plants to make Wright aircraft engines — *great today — even greater tomorrow.*

POWER FOR AIR PROGRESS

WRIGHT

Aeronautical Corporation • Wood-Ridge, New Jersey

A DIVISION OF CURTISS WRIGHT FIRST IN FLIGHT



VIEW FROM CATWALK 70 ft. above huge British Brabazon's wing shows coupled and buried engines. Each paired unit affords 5000 hp.

How Engines Are Coupled On Brabazon

Twin Centaurus power unit passes type test. Vibration is overcome.

Another significant phase has just been completed in the long series of preparations for readying Britain's huge Bristol Brabazon (AVIATION WEEK, June 27, 1949) for it initial flight trials.

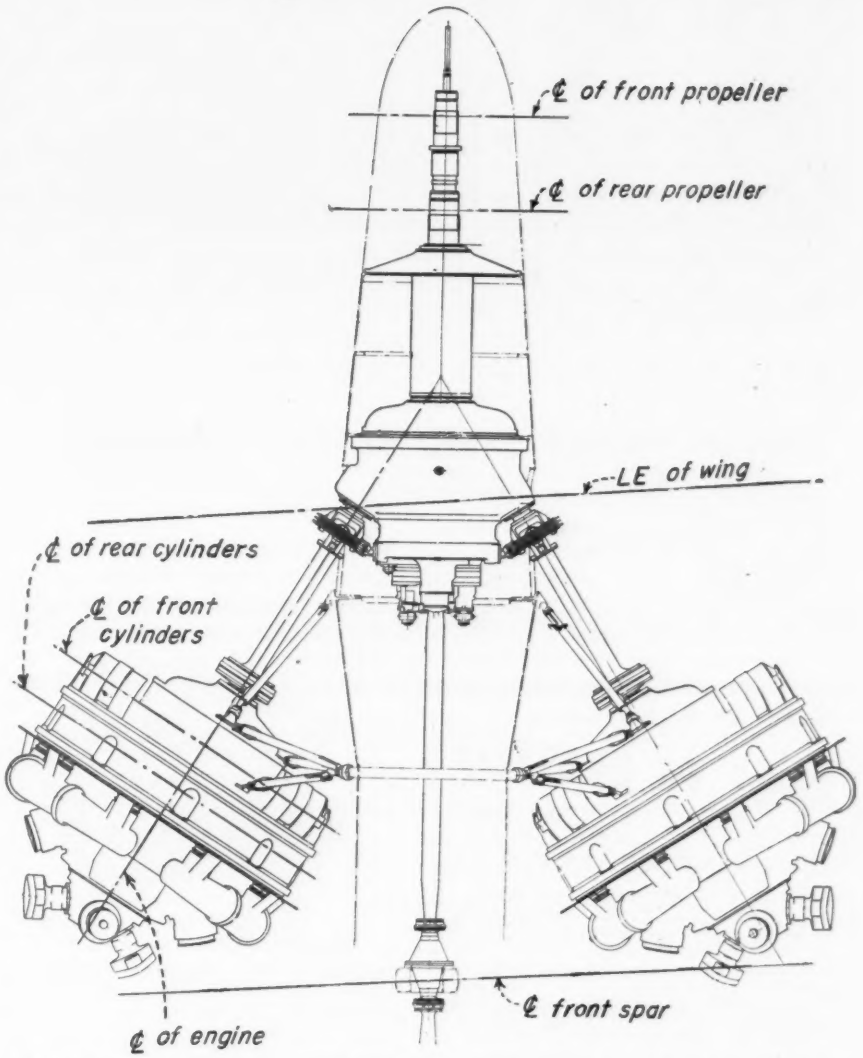
The twin Bristol Centaurus power unit, specially developed for the plane has successfully completed the first Air Registration Board Type Test ever accomplished by an aircraft engine installation of this makeup.

This means that the Brabazon's eight engines, arranged in four pairs and developing over 20,000 hp., have been officially approved for use in a civil aircraft several weeks before the prototype's taxiing trials are due to begin.

▶**Vibration Overcome**—Development of the Centaurus installation has involved as much research and experiment as a completely new engine. The type test, climax of over 1200 hr. of development running begun in February, 1946 when the unit ran for the first time, was carried out on a mockup of a 21-ft.-wide section of the Brabazon's wing to simulate flexibility and resilience of aircraft actual conditions.

The trial was the normal 150 hr. run, comprising 80 hr. at maximum continuous power (climb), 10 at takeoff power, 20 at maximum weak mixture power and 40 hr. at various cruising powers.

Results are significant because reports indicate that the problem of vibration—a troublesome factor in earlier coupled



PLAN OF HOOKUP for Brabazon's Bristol twin Centaurus power unit showing shaft connections to reduction gear. Tripod mounts are used instead of conventional ring installation.

THESE

Aircraft Quality

U·S·S CARILLOY ALLOY STEELS

ARE NOW AVAILABLE FOR

immediate shipment:

4130 — Rounds, flats, squares and hexagons to AN-QQ-S 684a as amended.

4130 — Sheets and plates to AN-QQ-S 685 as amended.

4140 — Rounds, flats and hexagons to AN-QQ-S 752a as amended.

4340 — Rounds and flats to AN-QQ-S 756a as amended.

UNITED STATES STEEL SUPPLY COMPANY USS STEELS SERVICE

Symbol of Service for Steel Users

● Now, from our conveniently located warehouses—coast-to-coast—you can get quick action on your orders for *Aircraft Quality* U·S·S Carilloy Alloy Steels. And when you place your order, you're sure of getting steels that measure up to the exacting requirements of your specifications for aircraft construction. For special care is given to every phase of manufacture. Carilloy Alloy Steels undergo very stringent examinations to prove their fitness for airplane parts, engines and accessories.

Telephone, wire or write our nearest warehouse or sales office for quick deliveries of *Aircraft Quality* U·S·S Carilloy Alloy Steels.

UNITED STATES STEEL SUPPLY COMPANY

USS

Warehouses: BALTIMORE · BOSTON · CHICAGO
CLEVELAND · LOS ANGELES · MILWAUKEE · MOLINE, ILL. · NEWARK · PITTSBURGH
PORTLAND, ORE. · SAN FRANCISCO · SEATTLE · ST. LOUIS · TWIN CITY (ST. PAUL)
Also Sales Offices at: KANSAS CITY, MO. · PHILADELPHIA · TOLEDO · TULSA · YOUNGSTOWN
Headquarters Offices: 208 S. La Salle St.—Chicago 4, Ill.

UNITED STATES STEEL

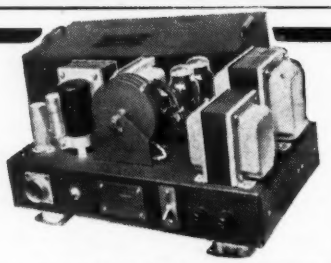
Manufacturer now offers

RA-62 VG RECTIFIER

Power Supplies for Ground Station Operation of SCR 522 VHF Radio

SPECIFICATIONS: INPUT: 110/120/220/240 volts A.C. 50-70 cps, 225 watts. OUTPUT: 300 volts D.C. at 300 ma 150 volts D.C. at 30 ma. 13 volts D.C. at 4.4 amp.

$138 fob factory



ALL RATINGS ARE FOR 24-HR. CONTINUOUS DUTY SERVICE (Now in CAA Service)

SPECIAL ELECTRONICS equipment manufactured to customer's specifications.

MODIFICATIONS ARC 3 RADIO FOR 32 CHANNEL CRYSTAL CONTROL.

ARC 1 RADIO for 20 channel crystal control.

AIRCRAFT TEST EQUIPMENT in production TS-67C, TS-170, TS-173, MB-2 (BC376), 1-100, An/ARM-1, IE-19A, TS-16, TS-10.

MFG. OF AM-FM WALKIE-TALKIES 35-45 mc and 116 mc.

MFG. OF HF and VHF AIRPORT GROUND STATIONS.

THE AMERICAN ELECTRONEERING CO. 2112 S. La Brea, Los Angeles 16, Calif.

types—has been licked. And strip-down at the end of the test revealed no defects in gears or bearings.

► **General Engine Layout**—Each power unit consists of two Centaurus 20 engines driving Rotol coaxial propellers through a common bevel reduction gear box.

The two powerplants are separately housed in fireproof cells in wing leading edge. Their centerlines converge at an included angle at 64 deg., and the engines are supported on a box section structure which is an integral portion of the wing. At forward extremity of this structure, the dual reduction gear box is carried.

Access for servicing or engine change, is through full size hinged doors in upper and lower wing skins.

Each engine, with its mounting, exhaust system and the cowling, forms a complete unit readily removable from its fireproof cell. The twin exhaust manifolds discharge rearwards, below the wing lower surface.

► **Engine Mounting**—To obviate any adverse effects of primary drive shaft misalignment, both engines with their dual reduction gearbox are carried by a central box structure. This structure forms a cantilever, projecting forward from the wing spar, and the upper and lower surfaces are portions of the wing skin.

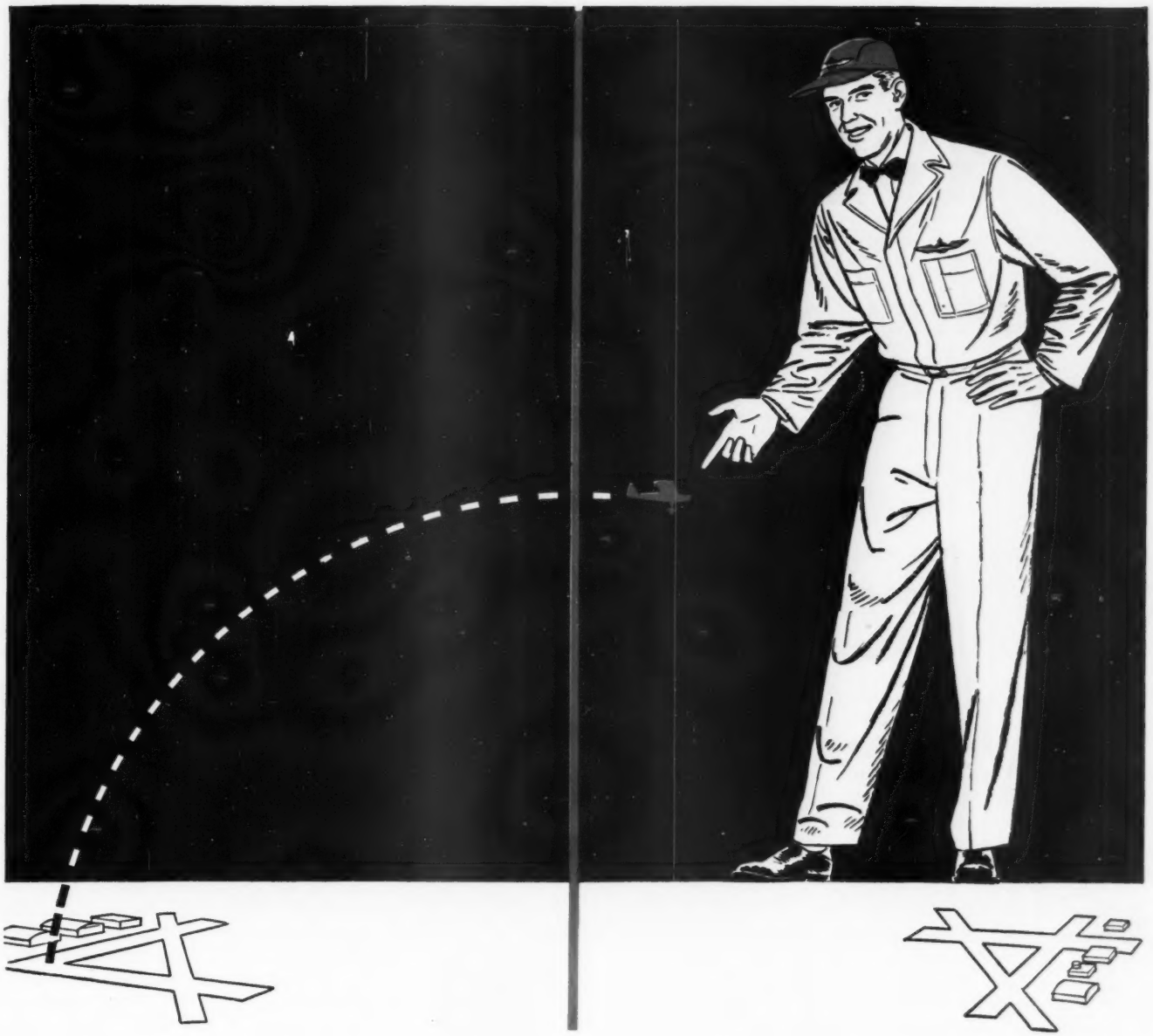
Each engine is attached to the box structure by tubular mountings. These take the form of twin tripods picking up the crankcase at their feet and with their apices secured at points near the top and bottom, respectively, of the box member by quickly detachable fittings.

The tripods take care of all vertical loads and torque reaction. To stabilize the assembly and to accommodate fore-and-aft accelerations, two additional tubes are provided, connecting top and bottom of the engine assembly to a common point near front of box structure. Quickly detachable fittings are provided at the engine end of these tubes.

Design of engine mount is intended to avoid the use of the usual mounting ring, and gives a considerable saving of weight.

► **Exhaust System, Cowling**—Exhaust discharge from the cylinders is directed rearwards through shrouded individual tubes which join in pairs to the bifurcated exhaust manifold. The two tapering curved units making up the manifold carry short discharge elbows at their lower extremities and are completely shrouded.

The shroud is divided into sections each with a separate cool air intake and multiple discharge orifices. Lowest of these sections is contiguous with the outlet elbow shroud which in turn is



Point of no return

STANDARD SKYWAY SERVICE
Everywhere in the Midwest

You take off from one airport featuring Standard Skyway Service . . . and in almost no time you've passed the halfway mark to another Standard Airport Dealer. There are so *many* Standard Airport Dealers on your line of flight throughout the Midwest that you're not concerned about the Point of No Return.

These hundreds of airports offer a full line of top-quality aviation fuels and lubricants, plus skillful, courteous service and aviation know-how that really make your traveling easier. No wonder they're such a popular choice of sky-wise pilots!

Standard Aviation Gasolines
Standard Aviation Lubricants and Hydraulic Oils
Quaker State Aero Engine Oils
Atlas Aircraft Tires, Batteries and Accessories

NOTE: The Standard Oil airport dealer franchise is a profitable one. Are you interested? Then write the Standard Oil Company (Indiana), Aviation Department, 910 South Michigan Avenue, Chicago 80, Illinois, and a qualified representative will call on you.

STANDARD OIL COMPANY (INDIANA)

ADEL

SPECIAL APPLICATION EQUIPMENT

Adel has unsurpassed facilities for the design, engineering and manufacture of a wide variety of aircraft equipment. Typical examples are shown here. Adel engineering and manufacturing versatility has brought about constant improvements in various types of aircraft products. Assistance in design problems is standard procedure offered at Adel. We invite your inquiry.

#17524

SELF-ADJUSTING CYLINDER WITH AUTOMATIC RETURN

A unique self-contained hydraulic lock cylinder with an automatic return employed for reclining adjustment of air liner seats. Cylinder is positively locked in position when passenger is seated but automatically returns seat to vertical position in three to ten minutes after it is vacated.

#21906

#20430

MECHANICAL DISENGAGING MECHANISM

A positive acting safety device for manual disengagement of engine driven accessories in case of system or equipment failure. Movement of shaft six degrees disengages clutch. Capacity 60 hp at 4000 rpm. Weight 4.88 lbs.

HYDRAULIC BRAKE FLUID RESERVOIR WITH VISUAL WINDOW

A simple, lightweight reservoir for hydraulic brake fluid. Visual window shows fluid level and indicates "full" and "refill" levels.

ADEL

ADEL PRECISION PRODUCTS CORP. BURBANK, CALIF. • HUNTINGTON, W. VA.

CANADIAN REP.: RAILWAY & POWER ENGINEERING CORPORATION, LIMITED

extended beyond the exhaust elbow proper. This insures that after leaving the manifold, the exhaust gas stream is encased in a "sleeve" of relatively cool air, thus reducing the heating effect on any portion of the wing or undercarriage with which the gas might come into contact.

The manifolds are supported on tubular units having provision for expansion from temperature change. Cylinders and heads are closely baffled for optimum cooling under all conditions of flight. Surrounding the cylinders is an abbreviated cowl of approximately cylindrical form. To facilitate sparkplug inspection, the cowl has small access panels immediately over the cylinder heads.

Rear end of the cowl assembly is in flexible contact with a diaphragm surrounding the engine and dividing the engine cell into two zones. Forward zone is in full ram air pressure, not only used for engine cooling, but also feeding the main engine air intakes. In addition, a duct conveys air from this region to the oil coolers located to the rear of the front spar.

After cooling the engine, the warm air in the region behind the diaphragm is discharged through controllable cooling flaps in the upper and lower wing skins. In normal flight conditions, the upper flap remains closed, thus maintaining drag at an absolute minimum while the lower flap is adjustable to control the degree of cooling.

► **Primary Drive Shaft**—Power from each engine is transmitted through a tubular driveshaft to the dual reduction gear. At the rear end, the shaft is bolted to the engine crankshaft flange through the medium of a flexible Layrub type coupling. This is a light alloy ring carrying a number of specially constructed rubber trunnions. Flexibility of the trunnion units is sufficient to accommodate any slight deviation from true alignment.

At the forward end, the shaft is united to the input flange of the dual reduction gear by a universal joint of the Hooke type. This is equipped with non-metallic, preloaded bearings requiring no routine lubrication. The design is such that, for engine removal, the drive is disconnected at the Layrub joint and swung to one side around one axis of the Hooke's coupling.

Means are provided for measuring the engine torque by electrically determining the degree of torsion in the primary drive shaft tube. For this purpose, two toothed inductor rings encircle the Hooke's joint. One of these is carried directly by the forward end of the drive shaft tube and the other is supported on a spider-shaped member, deriving its position from the engine end of the drive shaft. Associated with the in-

All the facts of value favor
CHEVROLET ADVANCE-DESIGN TRUCKS

America's truck operators are wise buyers. They know the value of prime power with economy . . . of massive load capacity . . . of outstanding quality, durability and handling ease. They know the advantages of the latest and finest features and of greater driver comfort and convenience. And they know that *all* the facts of value favor Chevrolet trucks to an overwhelming degree . . . that they cost less to operate, less to maintain, and have the lowest list prices in the entire truck field. That's why they use Chevrolet trucks more than any other make!

CHEVROLET MOTOR DIVISION, *General Motors Corporation*, DETROIT 2, MICHIGAN

TOP-VOLUME PRODUCTION BRINGS YOU TOP-VALUE FEATURES!

Chevrolet's new 4-SPEED SYNCHRO-MESH TRANSMISSION offers quicker, quieter and easier operation. Double clutching is eliminated because the gears are always in mesh. Faster shifting maintains speed and momentum on grades. Available in series 3800 and heavier duty models.

Chevrolet's power-packed VALVE-IN-HEAD ENGINES provide improved durability and efficiency as well as the world's greatest economy for their size!

Chevrolet trucks have the famous CAB THAT "BREATHES"*! Outside air is drawn in and used air forced out! Heated in cold weather.

Chevrolet Advance-Design brings you the FLEXI-MOUNTED CAB, cushioned on rubber against road shocks, torsion and vibration.

Chevrolet's exclusive SPLINED REAR AXLE HUB CONNECTION adds greater strength and durability to heavy-duty models.

Uniweld, All-Steel Cab Construction • Large, Durable, Fully-Adjustable Seat • All-Round Visibility with Rear-Corner Windows* • Heavier Springs • Super-Strength Frames • Full-Floating Hypoid Rear Axles in the 3600 Series and Heavier Duty Models • Double-Articulated Brake Shoe Linkage • Hydrovac Power Brakes in Series 5000 and 6000 Models • Multiple Color Options.

**Heating and ventilating system and rear-corner windows with de luxe equipment optional at extra cost.*

CHOOSE CHEVROLET TRUCKS FOR TRANSPORTATION UNLIMITED!

CHEVROLET

ductor rings is a double generator, in which electric impulses are induced. Phase differences between the impulses of the two portions of the generator provide an indication of true engine torque. This may be read off indicators disposed at the flight engineer's station.

► **Dual Reduction Gear**—An outstanding feature of the engine installation is the reduction gearbox. Two complete and independent reduction gears are incorporated in the magnesium alloy casing with means of driving the aircraft accessories, together with a system of lubrication and cooling, functioning whether either or both the engines are running. Reduction ratio is 0.411.

To ensure maximum efficiency of power transmission, a minimum number of gears are used in each train between engine and prop. Right hand power-input shaft carries at its forward extremity a straight tooth bevel pinion, the teeth meshing with the ground teeth of an internal bevel gear. This gear is splined to the large diameter tubular shaft, carried on ball and roller bearings in the magnesium casing, which drives the rear of the Rotol coaxial propellers. This shaft is made up of three sections, flange-bolted together.

Nesting in this shaft, and running in a series of roller bearings, is the inner propeller shaft carrying the forward propeller at its front extremity, and the main driving wheel at its rear extremity. In mesh with the teeth of this wheel are the teeth of the left hand input bevel pinion. The shaft carrying this pinion, in common with that carrying the right hand input pinion, is also supported on ball and roller bearings.

The coaxial propellers are rotated in opposite direction by the two Centaurus engines, while the crankshafts both rotate in the same direction.

In these gear trains, considerable heat is generated at the actual tooth contact point. To maintain a satisfactory temperature level, oil jets impinge upon the tooth flanks close to the point of contact. The oil, draining away, is cooled and recirculated.

► **Subsidiary Trains**—There are two subsidiary gear trains in the gearbox. One picks up the drive from the outer propeller shaft and conveys it through idler gears and a shaft to a free-wheel unit, to the aircraft accessory drive output shaft.

Second train picks up a drive from the inner propeller shaft, conveys it via additional idlers to the free-wheel unit and thus to the same aircraft accessory drive output shaft. This output shaft carries a small gear which drives the main oil pressure and scavenge pumps.

If either engine is shut down, the section of the free-wheel unit associated with the drive from that engine commences to slip or "free-wheel." The other engine meanwhile carries on with the drive.

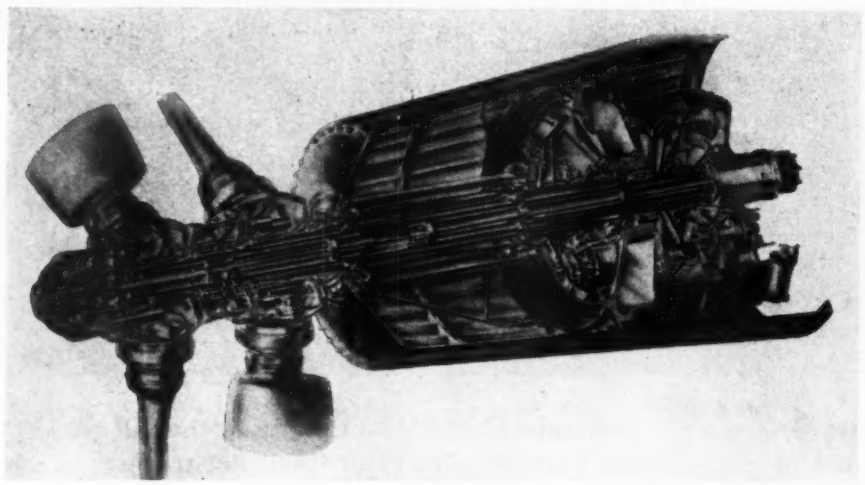
With both engines running, even though their speeds are nominally synchronized, there will be minor speed fluctuations between the two drives to the free-wheel unit. To avoid possibility of shock loading resulting from this, the drive ratios have been selected so that under synchronized conditions the entire accessory load is carried by the right hand engine. Meanwhile, that portion of the unit associated with the lefthand engine "free wheels" at a very low speed difference.

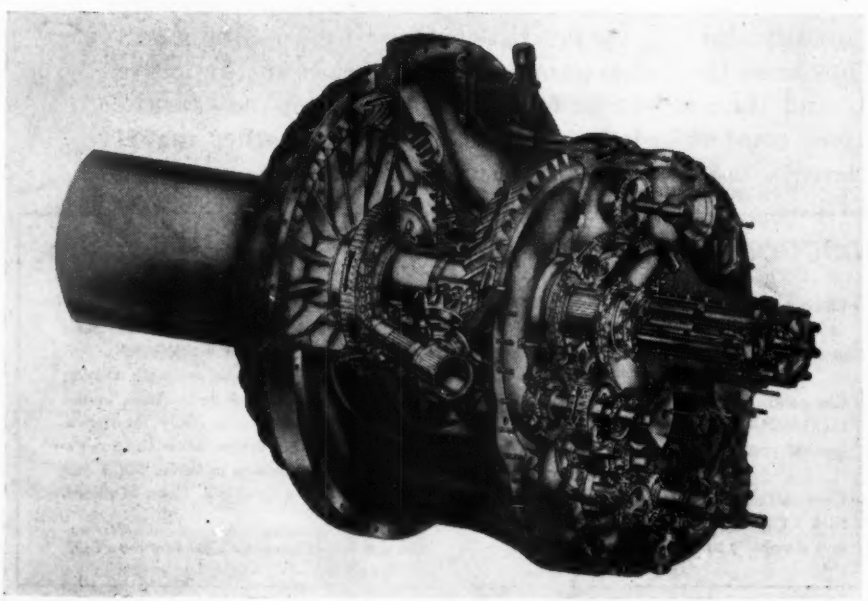
Accessories serving the co-axial propellers are located on the rear cover of the dual reduction gear unit. These consist of the propeller controller units and the synchronizing alternators. Drives for these devices are tapped off the gear trains which drive the free-wheel units.

► **Prop Feathering**—During single engine operation, the non-operative propeller is feathered to reduce drag. If front propeller only is feathered, the aerodynamic forces acting on the blades do not produce any propeller turning moment. With a feathered rear propeller, however, the blade angle for minimum drag is such that a reverse propeller rotating moment is produced.

Since reverse rotation of an engine is undesirable, means are provided inside the dual reduction gear to prevent this. Carried on the forward face of the internal bevel gear is a large-diameter ratchet wheel. Three pawl units equally spaced round the wheel, but attached to the front cover of the gearbox casing, are brought into action automatically by the propeller feathering oil supply.

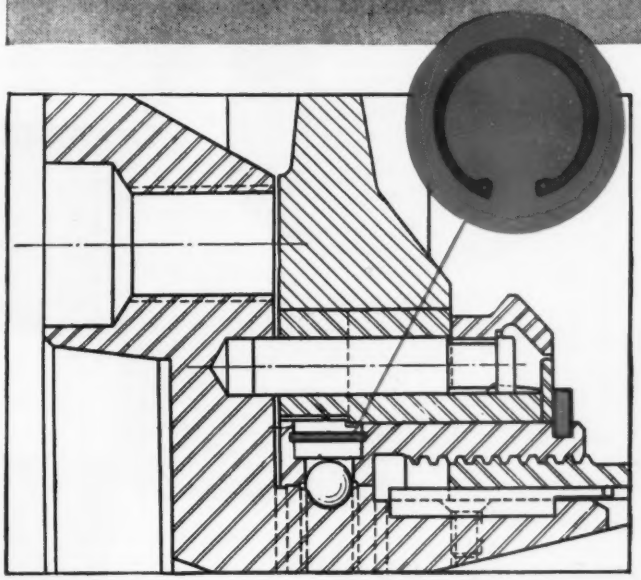
The pawls click over the ratchet wheel teeth while the latter is rotating in a forward direction with the rear propeller. As the feathering process is completed, the propeller slows down and comes to a standstill before the reverse torque builds up. At this point the



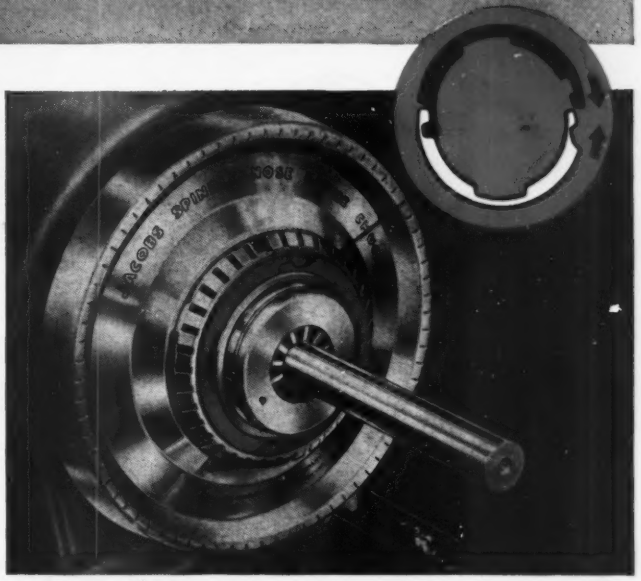


REDUCTION GEAR for twin Centaurus installation. Lower cutaway view is enlarged aspect of rear portion shown at top. Engine shaft connection, center, comes in at angle.

2 Waldes Truarc Rings Save Space ...cut costs...Lock entire chuck



INTERNAL RING: Used instead of a shoulder screw, Truarc internal ring #5000-37 locks disc over ball loading hole. Saves 1/8 inch in overall diameter. Eliminates tapping. Withstands machine vibration and vibration from impact device within chuck. Used with Truarc pliers, it facilitates assembly and disassembly.



INTERLOCKING RING: Used instead of a locknut, Truarc interlocking ring #5107-343 locks handwheel assembly securely on impact sleeve of Jacobs chuck. Saves 7/32 inch in overall length. Eliminates tapping. Chuck's top speed: 5000 RPM; Truarc ring is dynamically balanced to withstand 50,000 RPM's. Services easily with a screwdriver.

2 Waldes Truarc Retaining Rings secure the entire mechanism of new spindle nose lathe chuck for Jacobs Mfg. Co., Hartford, Conn. Truarc gives Jacobs a finer, more compact product, and at lower cost than possible with any other fastening device.

Wherever you use machined shoulders, nuts, bolts, snap rings, cotter pins, there's a Truarc Ring that does a better job of holding parts together.

Truarc Rings are precision engineered. Quick and easy to assemble, disassemble. Always circular to give a never-failing grip. They can be used over and over again.

Find out what Truarc Rings can do for you. Send your drawings to Waldes Truarc Engineers for individual attention, without obligation.

2 TRUARC RINGS GIVE 6 BIG ADVANTAGES

- **Cut overall length 7/32 in.**
- **Cut overall diameter 1/8 in.**
- **Eliminate cost of tapping**
- **Withstand up to 50,000 RPM's, give a factor of assurance of 10**
- **Withstand machine vibration**
- **Facilitate assembly, disassembly**

WALDES

TRUARC

REG. U. S. PAT. OFF.

RETAINING RINGS

WALDES KOHINOOR, INC., LONG ISLAND CITY 1, NEW YORK

WALDES TRUARC RETAINING RINGS ARE PROTECTED BY U. S. PATS. 2,902,948; 2,026,454; 2,416,052 AND OTHER PATS. PEND.

Waldes Kohinoor, Inc., 47-16 Austel Place AW-8
Long Island City 1, N. Y.

Please send 28-page Data Book on Waldes Truarc Retaining Rings.

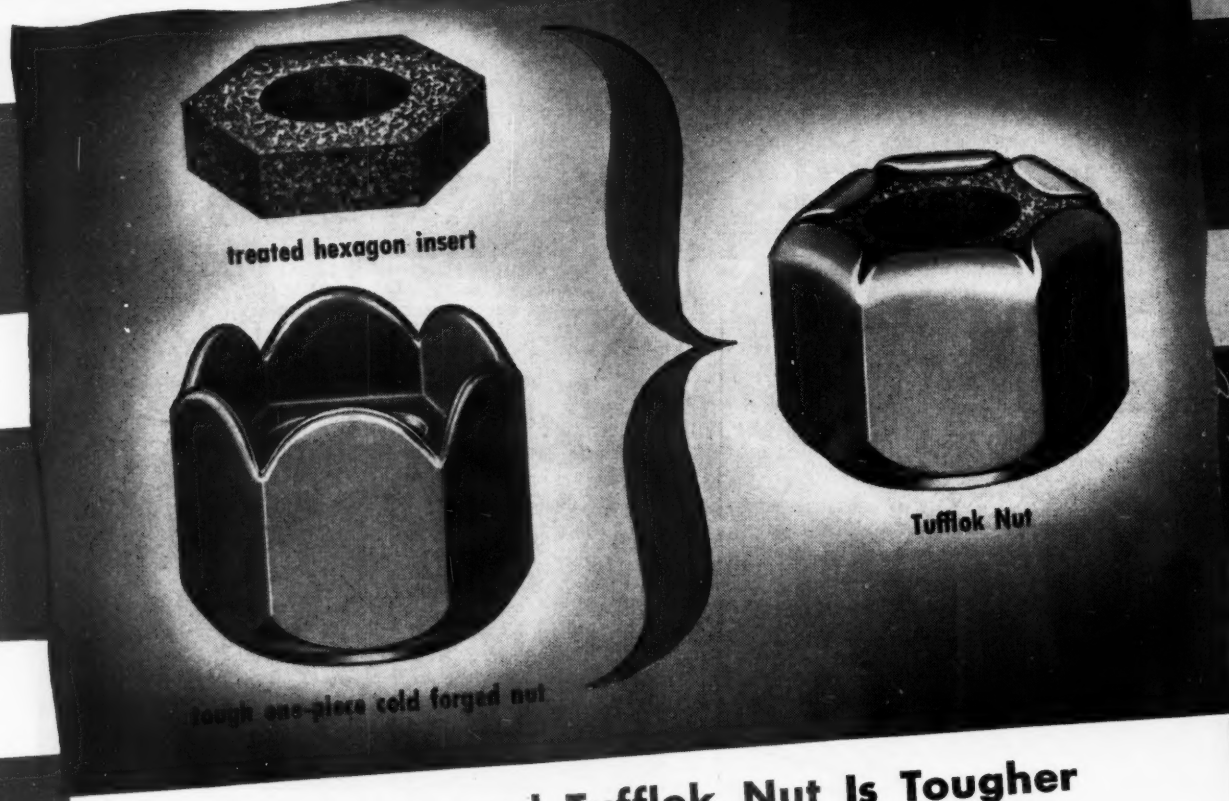
Name_____

Title_____

Company_____

Business Address_____

City_____ Zone_____ State_____ ★



New Townsend Tufflok Nut Is Tougher Three Ways To Give You Tighter Grip, Greater Safety, With Economy

You get a tighter grip, greater safety and economy with the new Townsend Tufflok nut. It gives you more service at less cost. The exclusive Tufflok design*, plus the materials in the insert and nut body combine to give you the toughest lock nut yet produced for any use where nuts must stay put under a variety of adverse conditions.

Here are the New Exclusive Features of the Townsend Tufflok Nut:

1. *Tough hexagon insert*—won't turn in its seat, gives you positive grip on the bolt at all times. Specially treated insert resists moisture, oil and drying out. Special inserts where special applications are required.
2. *Tough, one piece cold forged nut* has exclusive petal design to assure positive insert staking.
3. Tough threads *cut in cold forged steel* are stronger, spin on easier, resist galling, speed up application and also afford more reuse.

The quality, efficiency, and safety with economy, you get in the new Townsend Tufflok nut is made possible by the skill and experience gained by The Townsend Company as the oldest manufacturer of small cold formed fasteners in the United States. This know-how combined with the background of The Nylok Corporation in producing millions of lock nuts gives you the advantage of a reliable source for your lock nut requirements.

The new Townsend Tufflok nut with exclusive hexagonal treated insert and special cold forged body is available in AN 364 and 365 hex sizes No. 4 through 3/8", cadmium or zinc plated. This line will be increased in the near future.

For longer service with greater safety and economy specify Townsend Tufflok Nuts. Write today for samples and complete information.

THE TOUGHEST LOCK NUT EVER PRODUCED

*Licensed under The Nylok Corporation patents. Tufflok is a trademark of the Townsend Company.

Call or write today to:

Townsend

COMPANY — ESTABLISHED 1816

New Brighton, Pa.

ratchet wheel teeth are brought into abutment with the pawls, thus preventing reverse direction rotation.

In normal operation, an arrangement of springs in the pawl units completely retracts each pawl.

To preclude excessive torques in the reverse direction in the event of an unexpected occurrence, such as a backfire, the ratchet wheel mounting incorporates a high torque slipping clutch.

► **Lubricating System**—Three independent oil systems are provided. These supply, respectively, the lefthand and righthand engines and the dual reduction gear, and each consists of an oil cooler and a service oil tank.

Air to the oil coolers is ducted from the forward portion of each engine cell. The ducts run straight to the twin oil coolers which discharge their air through variable area shutters into the main wing space. The reduction gear cooler is jointly fed by small ducts from both the main cooler ducts. This also discharges into the wing space. Air outlets from the wing space are provided through the rear spar and upper wing skin, near the trailing edge.

Since the oil consumption of the gearbox and propeller system is of a minute order, the capacity of the tank feeding these units is correspondingly small. The oil specified incorporates a special additive to suit high duty gearing.

The engine oil tanks are also kept to the smallest practicable size, thus ensuring satisfactory behavior under cold climate conditions. A constant level is maintained in these service tanks, make-up oil being supplied from a common pressurized storage tank in the wing.

► **Fire Precautions**—Complete fire indicating and extinguishing equipment is built into the powerplant. At critical points on each engine, and attached to the fireproof walls of the engine cell, are a series of flame detecting switches electrically connected to a fire warning indicator at the flight engineer's station.

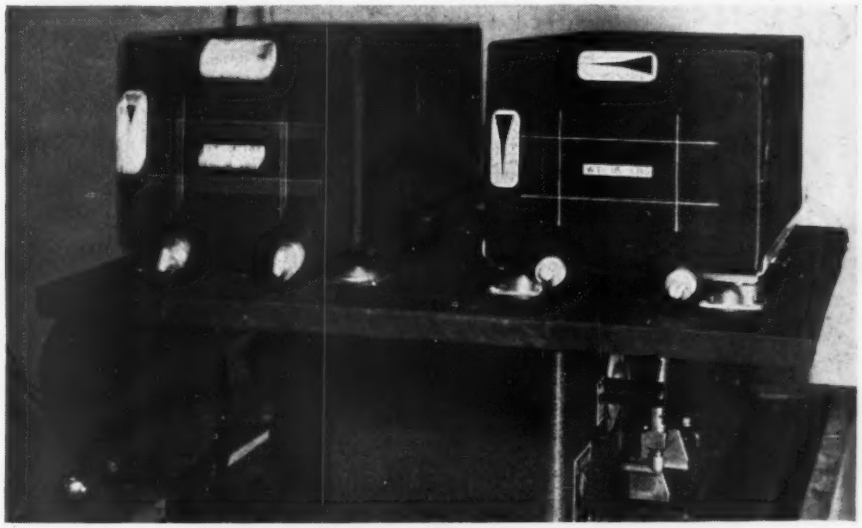
Should fire break out, he will be immediately notified, stop the engine, feather the prop, close the cooling air inlet and outlet shutters, turn off the fuel and oil, and put the fire extinglisher system into operation.

The extinguishing system consists of a series of rings encircling the forward and aft portions of the engine, through which methyl bromide is forced. In addition, methyl bromide is taken to the exhaust manifold and to the engine air intakes, to insure that combustion within the engine ceases immediately.

To prevent any possibility of flames from an engine cell from penetrating to the wing space behind the spar, shutters are provided at the entry to the oil cooler air ducts.

► **Aircraft Accessories**—These are operated both electrically and hydraulically, and are maintained by pumps and alternators driven by the main engines. They are grouped around the accessory gearbox, which, in turn, is securely bolted to the floor of the wing space between the two spars. Lubrication of this gearbox is self contained, a sump of moderate capacity and pump being provided.

Drive to the gearbox is by high speed shafts connecting with the accessory drive output shaft at the dual reduction gear. This shaft is in two sections, each approximately 5½ ft. long, connected by a short intermediate shaft carried in bearings in a housing secured to front members. At each end of both sections of the shaft are flexible Layrub-type joints.



VIBRATION TEST: left is conventional mount; one on right has wire cushions.

Wire Cushions Isolate Shock

Pads of molded steel threads prove more advantageous than rubber or springs for shock mounts.

Thousands of tiny stainless steel threads, knitted and molded under high pressure into cushions, have been found to outperform rubber or springs when installed in shock and vibration isolation systems.

Developed after three years of research by Robinson Aviation, Inc., these Met-L-Flex cushions are now incorporated in Robinson's dual suspension Vibrashock mounts. Orders already have been received from Bendix Aviation's Eclipse-Pioneer division and Servomechanisms, Inc., for military contract work.

► **Advantages**—The new material, according to Robinson, has these advantages over rubber and springs:

- It is unaffected by operating temperature extremes because its makeup is all-metal.
- High damping action is provided through interwire friction in each cushion, reducing amplification at resonance and effecting greater structural stability in the mounting system.
- Drift, or permanent set rate, is negligible.
- It does not deteriorate in the presence of oil or moisture.

Vibrashock mounting systems equipped with Met-L-Flex can be underloaded or overloaded by as much as 35 percent and still exceed vibration isolation specifications.

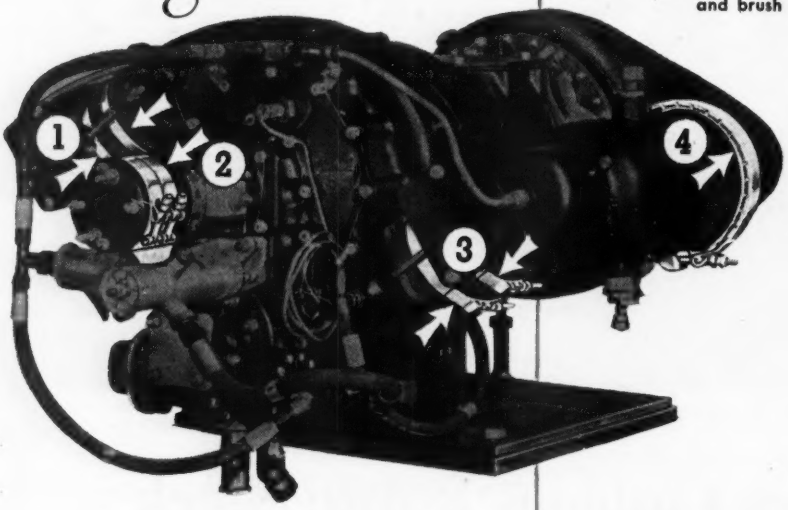
► **Almost Passed Up**—Met-L-Flex almost didn't happen. The company which manufactures the knitted metal first tried to interest other shock mount producers in the product. Robinson itself at first saw no real use in the material. Robinson had been engaged in Vibrashock mount production during the war and found sponge rubber and spring cushions adequate to perform vibration and shock control.

First experiments with the material, however, convinced Robinson's engineers that it could overcome many disadvantages found in currently used materials.

► **Forming Process**—The wire, approximately .005 in. in diameter, is first knitted, then processed mechanically by crimping and folding. The material is then molded under high pressure into the desired shape. Resulting cushion will hold its form and maintain its elasticity under any loads which do not closely approach the pressure originally used for molding.

In special tests for AVIATION WEEK,

4 points to remember about this baby gas turbine



This outstanding new gas turbine developed by AiResearch is essentially a jet engine itself. It is used as a source of power to start the big jet engines in today's modern planes.

Marman couplings, specified at four important points on the baby jet, go a long way toward solving the many difficult coupling problems encountered in the design of such a product. More and more industry is relying on standard Marman Products to perform tasks which once required individually designed devices.

1. T-Bolt clamps for combustion chamber flex joint.

2. Multiple take up clamp for positive seal of electric starter dust seal and brush cover.

3. T-Bolt Clamps for flexible joint between combustion chamber and compressor.

4. Ventilated coupling joining combustion chamber to turbine.

The Marman line includes couplings for all types of joints—straps for supporting tanks and accessories—band clamps for all kinds of hose and flexible bellows. You will save design and production time and cost by designing Marman standard types right into your product in the same manner that you would specify a standard nut or bolt.

FOR INFORMATION WRITE DEPT. A-4

MARMAN PRODUCTS CO. INC.
940 W. FLORENCE AVENUE
INGLEWOOD, CALIFORNIA

Vibrashock mounts equipped with Met-L-Flex cushions visibly outperformed conventional rubber shock mounts. On test vibrators it was possible to balance coins on dummy weighted boxes vibrating over 2000 cycles per minute. Uneven distribution of weight within the box caused no appreciable change in the absorbency of the mount. Conventional mounts on the test equipment vibrated to such a degree that it was impossible to read lettering at close range on the dummy box.

► **New Vibrashock Feature**—Robinson is not selling the Met-L-Flex cushions separately, but will include them in Vibrashock mounts, sales of which exceeded $10 million up to the latter part of May, 1949. Currently the company manufactures the mounts in its Teterboro, N. J., plant, and plans are now being discussed for facilities to manufacture the Met-L-Flex cushions.

Brake Anti-Skid Unit Cuts Landing Run

A brake attachment which automatically prevents skidding and is capable of substantially decreasing aircraft stopping distances has been developed by Boeing Airplane Co., Seattle, Wash.

The new attachment has been licensed to Hydro-Aire, Inc., Burbank, Calif., who will manufacture and sell the device commercially. It already has

ANTI-SKID DEVICE on the landing gear of a YC-97A Stratofreighter is pointed out by Gordon Yarber, Boeing engineer in charge of the developmental program. This portion of the device similarly is located in the center of each of the plane's other three main wheels. The outermost portion is the slotted driving link which engages hub cover pins of the landing wheel, while the section behind it is a housing which hermetically seals the entire device.

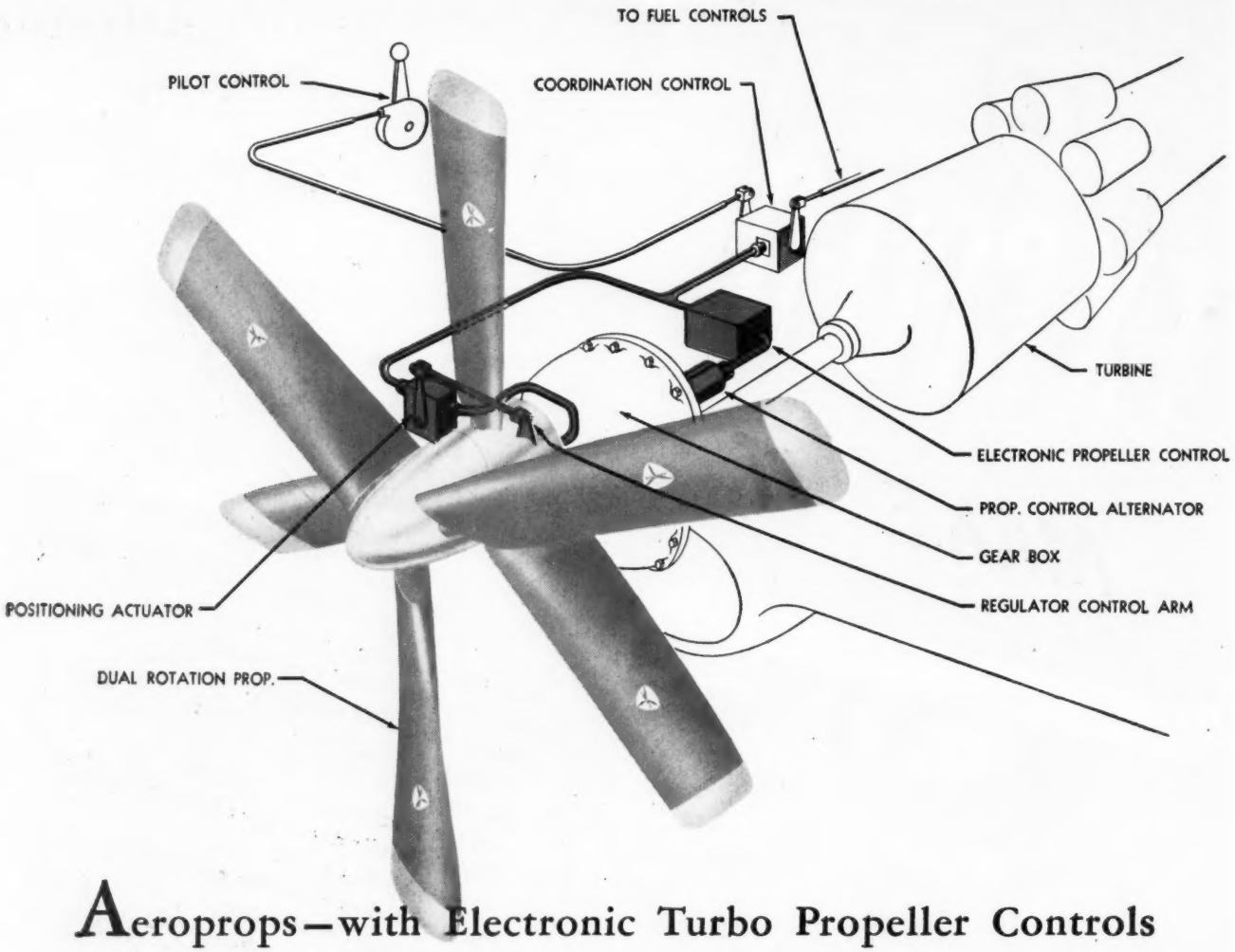
LET EX-CELL-O MAKE IT

Precision parts and sub-assemblies, made to customers' specifications, are an Ex-Cell-O specialty. Typical of Ex-Cell-O's products for the aircraft industry are the precision parts (at left) and hydraulic assemblies (above) shown on this page. Ex-Cell-O has complete engineering, machining, heat-treating, grinding, sub-assembling, and inspection facilities—all under one competent, experienced management. Ex-Cell-O makes precision parts to your specifications, in small or large volume, and delivers them in accordance with your schedule. To see how this service can benefit you, write Ex-Cell-O in Detroit today.

EX-CELL-O CORPORATION DETROIT 32

Special Multiple Way-Type Precision Boring Machines • Special Multiple Precision Drilling Machines • Precision Boring, Turning, and Facing Machines and Fixtures • Precision Cylinder Boring Machines • Precision Thread Grinding Machines • Precision Lapping Machines • Precision Broach Sharpening Machines • Other Special Purpose Machines • Tool Grinders • Continental Cutting Tools • Broaches and Broach Fixtures • Counterbore Sets • Grinding Spindles • Hydraulic Power Units • Drill Jig Bushings • R. R. Pins and Bushings • Fuel Injection Equipment • Dairy Equipment • Aircraft and Miscellaneous Production Parts

49-6



Aeroprops—with Electronic Turbo Propeller Controls

Precise Automatic R.P.M. Selection . . . RPM is automatically scheduled by the pilot's selection of an operating setting. The precise RPM for best performance and fuel economy is thus assured.

Instantaneous Control . . . Response of the system to offspeeds is instantaneous. Pitch change is obtained by biasing components which are already in motion, thus eliminating inertia and friction time lags.

Acceleration Sensitivity . . . Acceleration Sensitivity is a requirement for effective turbo propeller control because of the high inertia involved and the great sensitivity necessary to satisfy close speed limitations. The Aeroproducts control provides simple, effective acceleration sensitivity.

Complete Safety at All Times . . . Additional powerplant protection over that provided by the normal governing system is obtained from a single propeller-contained hydraulic governor of a type proven by years of service. Protection against involuntarily entering the feathering or negative thrust blade angle ranges is provided.

• *Aeroproducts Division of General Motors Corporation has developed propellers and a control system fulfilling the requirements of turbine engine installations, and provide in addition automatic synchronization for multi-engine installation. Let Aeroproducts — backed by General Motors Research — help with your Turbo-Prop planning now.*

Aeroprop

BUILDING PROPELLERS FOR AIRCRAFT TODAY
DESIGNING PROPELLERS TO MEET TOMORROW'S NEEDS

AEROPRODUCTS DIVISION • GENERAL MOTORS CORPORATION • DAYTON, OHIO

been successfully tested on the Boeing XB-47 and YC-97A. It currently is being installed for testing on a Stratocruiser.

▶ **What It Does**—Operation of the airplane's normal hydraulic brake sets in motion an electronically controlled valving unit which keeps braking pressure just below the skidding point at all times. This gives the plane maximum runway friction regardless of the type landing strip. Boeing engineers point out that a skidding wheel does not exert maximum stopping power.

After the plane hits the runway, the pilot applies his brakes in the usual manner. Normal braking action results until a fraction of a second before a skid would normally start on either or both sets of wheels.

▶ **How It Works**—At that point, deceleration of the wheels on the runway causes a supplemental valve in the hydraulic system to open and reduce braking power just enough to retain maximum braking without skid.

This cycle is repeated automatically as often as necessary until the craft comes to a full stop.

▶ **What It Is**—The control device consists of a rotary inertia mechanism and a system incorporating a flywheel, electrical contacts and slippage clutch, all hermetically sealed in an aluminum housing. The axis of the flywheel shaft is centered on the shaft axis of the landing wheel. The flywheel shaft is coupled to the landing wheel and turns integrally with it. An integral "fail-safe" device allows normal braking should the non-skid system fail to operate.

An advantage of the new brake device, besides shortening landing distances and eliminating skidding hazards, is its potential for lengthening tire life.

Attachment is claimed to be particularly applicable to tandem landing gear airplanes because of the unequal weight and load fluctuation between wheels during landing.

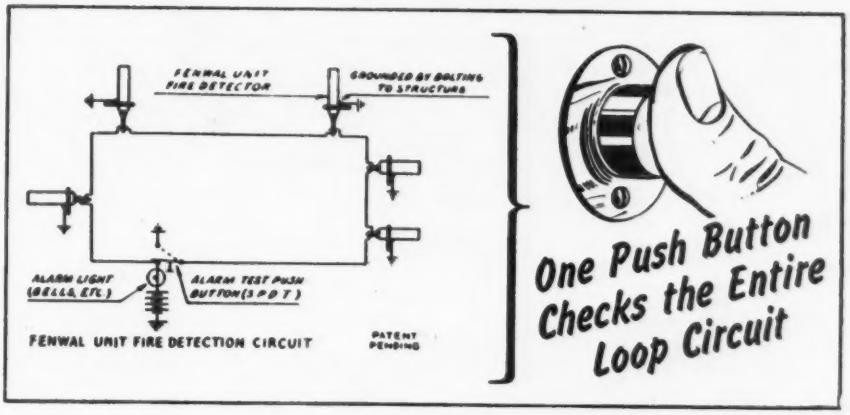
Old Files Reclaimed

A new electro-etching process which restores shopworn files and rasps to original sharpness has been developed at Fairfield-Suisun Air Force Base, Calif.

Worn files are electro-cleaned in chromic acid, then dipped in a very strong nitric acid solution. They finally are re-dipped in chromic acid a second time to restore original brightness to the parts.

The process was developed by Robert Rohweller, a civilian employe in the welding and plating section of the base shop. It takes less than five minutes to complete and is reported to save the government about 30 cents on every 40-cent file destined for the scrap pile.

No other aircraft fire detector circuit is so SIMPLE, so FOOLPROOF...


FENWAL UNIT FIRE DETECTOR
GROUNDED BY BOLTING TO STRUCTURE
ALARM LIGHT (BELL, ETC.)
ALARM TEST PUSH BUTTON (S.P.D.T.)
FENWAL UNIT FIRE DETECTION CIRCUIT
PATENT PENDING
One Push Button Checks the Entire Loop Circuit

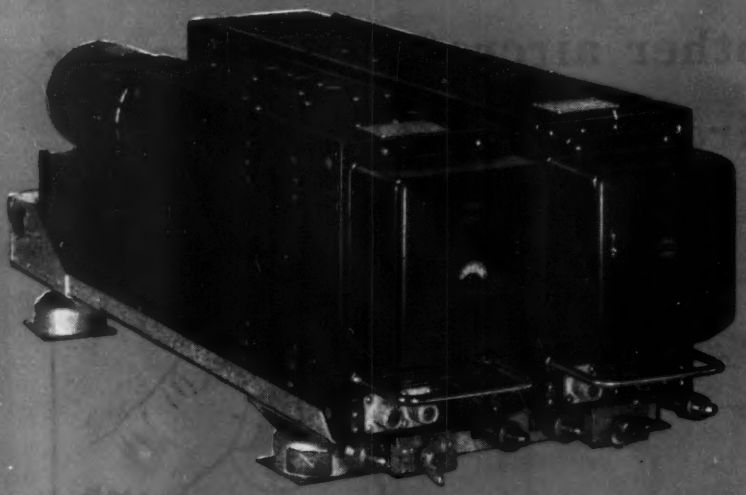
UNIQUE FENWAL SAFETY CIRCUIT . . . single conductor loop circuit with ground return . . . *detectors operate even if conductor is accidentally broken anywhere in the circuit* . . . even a double break only eliminates detectors located between breaks; others remain operative. Each detector operates independently — no averaging effects. This safety circuit is exclusive with Fenwal!

NO BULKY PANELS, SUPERVISORY INSTRUMENTATION OR RELAY SYSTEMS to buy, check and maintain.

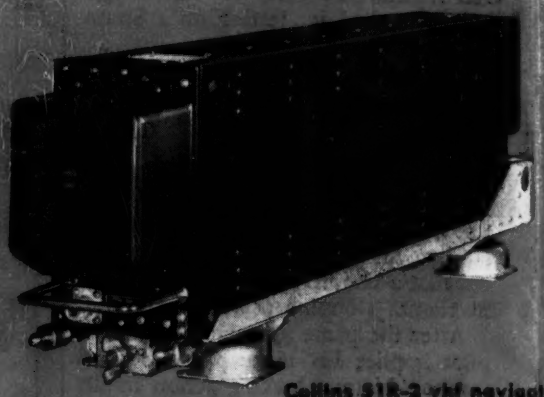
Temperature-sensitive unit is the hermetically sealed stainless steel shell which protects the internal actuating mechanism. Weighs only 2 ounces. Gives fast response . . . positive protection. Built-in rate of rise bias eliminates thermal lag, assuring instant, positive, fixed temperature response under all conditions. Unaffected by vibration . . . calibration permanently set at factory. Repeatable . . . detects over-heat or actual fire and resets itself.

The Fenwal Aircraft Fire and Over-Heat Detector fully complies with CAA Technical Standard Order C11 in accordance with S.A.E. Specifications AS-401. Write for data: Fenwal Incorporated, 77 Pleasant Street, Ashland, Massachusetts.

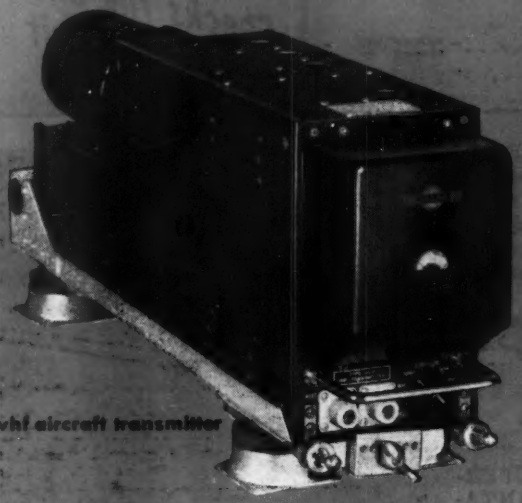
Fenwal
THERMOSWITCH*
*Reg. U.S. Pat. Off.
Aircraft Fire and Over-Heat Detectors
SENSITIVE... but only to heat



Collins 17L and 51R in dual shockmount



Collins 51R-2 vhf navigation receiv



Collins 17L-2 vhf aircraft transmitter

Collins 51V-1 glideslope receiver

The development of a full line of navigation and communication equipment for aircraft use in the vhf and uhf bands is a continuing, first-line project at Collins Radio Company.

The purpose is to make available to the aviation industry complete, integrated radio facilities fulfilling all requirements for navigation and communications over the Federal airways.

This program is closely meshed with, and will progress with, the interim and long-range programs of the Radio Technical Commission for Aeronautics.

All of the equipment shown and briefly described on this and the opposite page is brand new, designed to the latest specifications for the applications defined.

51R-2 Navigation-Communication Receiver

The new Collins 51R-2 vhf receiver, available now, is a refinement of the 51R-1, with which the airlines have been familiar since 1947. It covers the frequency range 108-136 mc on a 100 kc channel basis. Full instrumentation circuits are provided in the receiver and accessories for reception and presentation of all radio services now available in this portion of the spectrum.

The channel selection circuits of the equipment are arranged to accommodate addition of a glideslope receiver, such as the Collins 51V-1, to the system. Thus choice of appropriate localizer and glideslope channels is afforded from a single control unit. The 51R-2 receiver is also designed for use as a companion unit to the Collins 17L-2 vhf transmitter, the two together forming a two-way vhf voice communication equipment.

37J-1 vhf Navigation Antenna

The new Collins 37J-1 antenna is designed for use with the 51R-2 receiver. Its band width is 108-122 mc at 5/1 standing wave ratio or better, to feed a 52 ohm unbalanced line. The drag is only 2.63 pounds at 250 miles per hour.

The 37J-1 is constructed of cast aluminum, tubular alloy and natural rubber, and weighs 5.75 pounds. It is CAA type certificated and mounts interchangeably with the type AS-27/ARN antenna.

51V-1 Glideslope Receiver

The Collins 51V-1 glideslope receiver, now in limited production, provides reception of 90/150 cps tone modulated glideslope signals on any of the twenty channels in the uhf range of 329-335 mc. This receiver together with the Collins 51R navigation equipment will fulfill ILS receiving requirements for military, commercial and private aircraft. Design of the 51V-1 receiver is based on "Glideslope Receiver Characteristics" issued by Aeronautical Radio, Inc., and on U. S. Air Force specifications.

Output circuits of the type 51V-1 receiver feed standard ID-48/ARN deviation indicators including flag alarm. By means of the flag alarm the pilot has a positive indication of the reliability of the glideslope signals and instrumentation.

The 51V-1 receiver control circuits are integrated with the standardized R/O channeling system with channel selection provided by means of a Collins 314U remote control unit.

37P-1 Glideslope Antenna

The new Collins 37P-1 antenna, for use with the 51V-1 glideslope

Collins 37J-1 vhf navigation antenna

Collins 37P-1 glideslope antenna

NEW! Equipment to implement the VHF program

receiver, is engineered for reception of horizontally polarized signals in the range 328-336 mc. A standing wave ratio of less than two to one is obtained over this range with the antenna terminated in 52 ohm coaxial cable. The 37P-1 is constructed for mounting horizontally (±30°) on the nose of an airplane with the coax fitting protruding through the skin of the ship. The design is such that it may be used on pressurized cabins. With this antenna properly mounted, an increase of from 6 to 10 db in voltage pickup is obtainable over dipole antennas now installed for this use.

17L-2 vhf Transmitter

The new Collins 17L-2, available early this fall, provides transmitting facilities on all channels reserved for aircraft communication in the vhf band. Its frequency range is 118.0 to 135.9 mc, and all of the 180 channels assigned in this range are easily selectable over a simple and positive remote control system. The power output on phone is conservatively rated at eight watts, assuring that transmissions will be received and acknowledged at the busiest air terminals.

The 17L-2 transmitter is intended as a companion equipment to the Collins 51R vhf navigation-communication receiver. This receiver, together with the 17L-2, will provide full two-way voice communication facilities on all Federal airways vhf communication channels.

* * *

Illustrated bulletins are available, providing more detailed descriptions and the operating specifications for these two receivers and the transmitter, together with their accessories. You are invited to write for your copies.

IN AVIATION RADIO, IT'S . . .

COLLINS

COLLINS RADIO COMPANY, Cedar Rapids, Iowa

11 W. 42nd St.	2700 W. Olive Ave.	M & W Tower	Talbot Bldg.	Fountain City Bank Bldg.
NEW YORK 18	BURBANK	DALLAS 1	DAYTON 2	KNOXVILLE

Need Power in a Small Package?

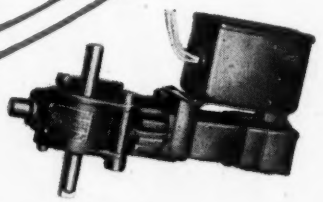
put it up to EEMCO

Just as during the war, EEMCO has continued on into peacetime its concentration on serving the aircraft industry... performing a specialized design, development, engineering and manufacturing service. Leading aircraft builders have asked us to contribute to some of the most important aircraft of the last decade, and to many more now under development. EEMCO-built motors and actuators have solved the very toughest problems of function, power, size, weight, shape, performance, installation and operation. Let EEMCO tackle *your* problem.

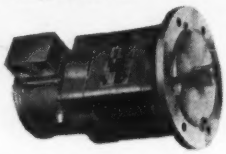
Actuators and Motors like these
...of difficult and unusual design...
are our specialty

STABILIZER ACTUATOR, Linear Type
Motor inline with screw. Magnetic clutch. Radio noise suppressors. Travel limit switches. Weight, 14 lbs. Normal load, 2500 lbs. Rate of travel, half-inch per second.

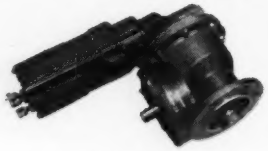
STABILIZER ACTUATOR, Linear Type
Magnetic clutch, radio noise suppressors. Normal load 2500 lbs. Maximum load, 8,000, static, 20,000 lbs. Stroke 7-1/2 in. Rate of travel, .62 inches per second. Weight, 17 lbs. Non-jamming end stops.



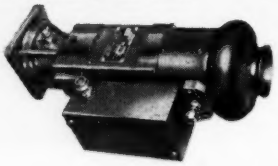
CANOPY ACTUATOR FOR JET FIGHTER
Rotary type, with manual overdrive and radio noise filter. 81 R.P.M. on the double end output shaft. 150 inch-lbs. torque. Weight, 6-1/4 lbs.



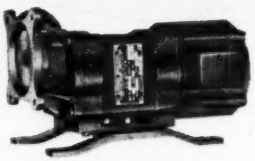
STARTER-GENERATOR FOR JET TURBINE
12 or 24 volts. 70 inch-lbs. torque at 2000 R.P.M. as a starter. Continuous output as a generator—35 amps at 12 volts, 15 amps at 24 volts. Weight, 15 lbs.



VARI-CAM ROTARY ACTUATOR
Magnetic clutch and brake. Overload torque limiter. Provision for manual operation.



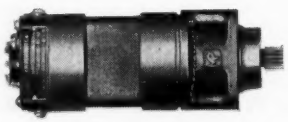
HYDRAULIC PUMP DRIVE MOTOR
Open through ventilated for continuous duty. 3-3/4 H. P. continuous. Equipped with radio noise filter and integral gear reduction . . . Weight, 23-3/4 lbs.



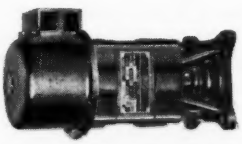
EXPLOSION PROOF AILERON BOOSTER MOTOR
Explosion proof, continuous duty. 1-1/2 H. P. continuous duty rating. Peak intermittent duty rating, 2.7 H.P.

EXPLOSION-PROOF MOTOR EQUIPPED WITH AIR DUCTS
Intake and exhaust ducts for external air cooling. Continuous rating of 4 H.P. with a ram of 12-inch head of water pressure; 2-1/2 H.P. when drawing its own air for cooling. Intermittent peak output, 7 H.P. 27 volts, 9000 R.P.M. Weight, 19-1/4 lbs.

DRIVE MOTOR FOR RADAR SCANNER
400 watts output continuous. 12,000 R. P. M. reversible. 600 watts peak load. Weight, 4-1/2 lbs.



PILOT SEAT ACTUATOR MOTOR AND CLUTCH
30 second duty cycle, 1/2 minute out of 10 minutes at 95 watts output. Weight, 18 oz. Specifications can be varied to suit special conditions.



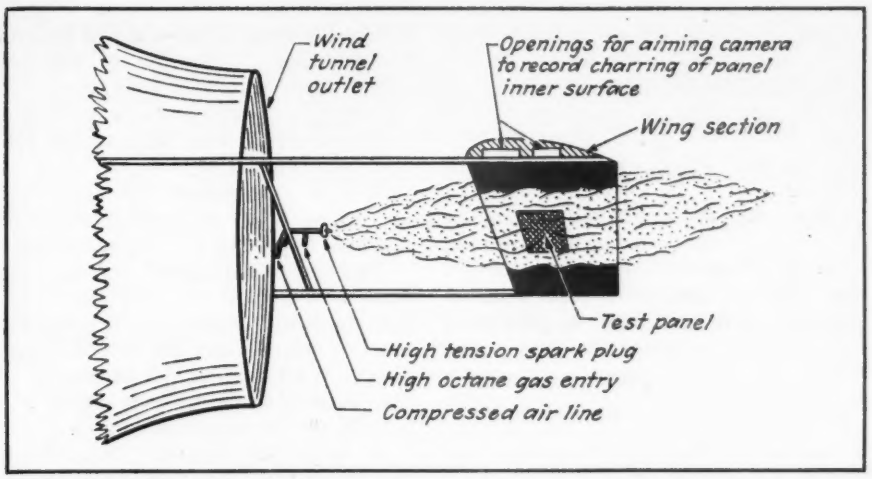
AILERON BOOSTER MOTOR
Open through ventilated for continuous duty operation. Integral gear reduction. Weight, 12 lbs. 2 H. P. continuous rating.

TELL US YOUR REQUIREMENTS
Check with us on a current motor or actuator design problem.
Give us the following preliminary data:
Type of unit • Specific function • Special requirements • Operating conditions • Motor and actuator specifications
Any available drawings, diagrams, and tables should be provided.

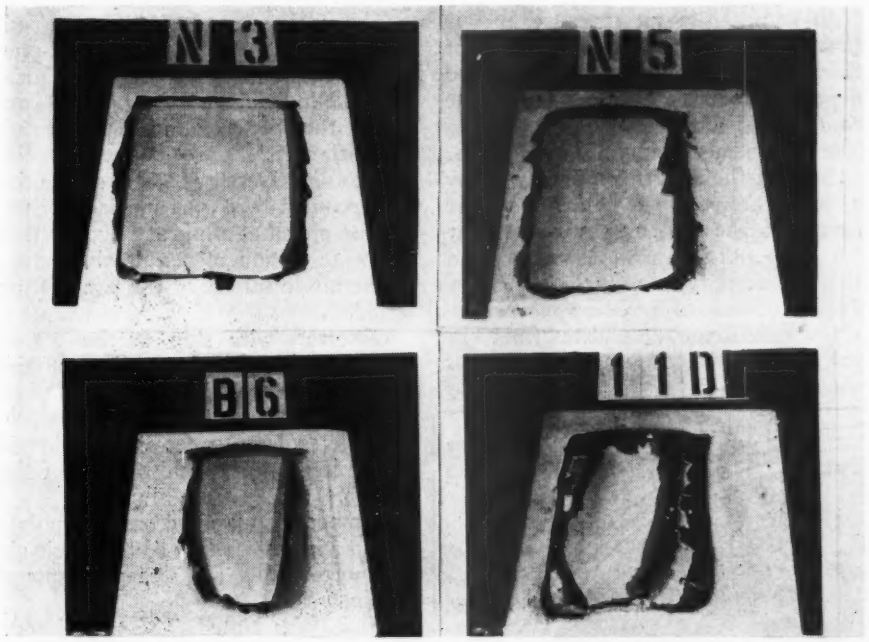
ELECTRICAL ENGINEERING and MFG. Corp.

EEMCO

4606 W. Jefferson Blvd., Los Angeles 16, California


Wind tunnel outlet
Openings for aiming camera to record charring of panel inner surface
Wing section
Test panel
High tension spark plug
High octane gas entry
Compressed air line

BURNING TESTS of fire-retardant coatings for fabric-covered aircraft gave these results . . .



. . . UPPER LEFT: Panel treated with highly flammable cellulose nitrate dope only; destruction time, 2 sec. Upper right: Panel coated with cellulose nitrate dope plus 4 coats of fire-retardant mixture; destruction time, 4 sec. Lower left: Panel coated with less flammable cellulose acetate butyrate dope but with no fire-retardant coating; destruction time, 6 sec. Lower right: Panel coated with cellulose acetate butyrate dope plus 4 coats of same fire-retardant mixture; destruction time, 12 sec.

Fire-Retardant Coatings Evaluated

Studies made under joint NBS-CAA program aim to boost resistance of fabric-covered aircraft surfaces.

New data which show promise of boosting lightplane safety have been uncovered in a joint research program of the National Bureau of Standards and the Civil Aeronautics Administration.

Laboratory and wind tunnel tests conducted by S. G. Weissberg, H. L. Hansberry and G. M. Kline have resulted in development of a new fire-retardant coating for fabric-covered planes, which appreciably extends the time interval between ignition of the fabric and its destruction as a result of fire.

▶**Control Surface Factor**—It has been evident that it is useless, especially in small planes, to provide elaborate means for detection or extinguishment of fire if the fabric control surfaces burn away before the equipment can be set in operation.

The highly flammable cellulose-nitrate dope used on airplane fabrics has been responsible for much loss of life and property by fire. Although dopes based on other cellulose derivatives, such as ethyl cellulose, cellulose acetate, and cellulose acetate butyrate, are much more difficult to ignite and have a much lower flame velocity, even they are unsatisfactory in a powerplant fire, in which flame from gasoline or oil may be in continuous contact with doped fabric for several seconds.

▶**Coating Requirements**—Yet no fire-retardant, film-forming materials are known which tauten airplane fabrics as effectively and as permanently as do the dopes based on the cellulose derivatives.

Unfortunately, addition of resins or other fire-retardant substances to these compounds lessens their capacity to tauten.

Hence, efforts were directed toward the development of highly efficient fire-retardant coatings to be applied to the surface after it is already doped.

In designing the coatings, the peculiar requirements of aircraft use made it necessary to consider not only fire-retardant effectiveness but also areodynamic smoothness, adhesion, flexibility, effect on tautness of the substrate dope, application characteristics, durability, and resistance to gasoline, oil, and ethylene glycol.

The materials which have been used most successfully in fire-retardant coatings for other purposes include film-forming substances and pigments which, in burning, give off large quantities of noncombustible gases; substances which exclude oxygen by forming an impenetrable protective glaze; and compounds which absorb the heat of the flame through endothermic changes.

▶**Materials Evaluated**—Typical of the film-forming plastic materials studied were chlorinated rubber, chlorinated Neoprene, chlorinated polyisoprene, vinyl chloride-acetate, vinylidene chloride-acrylonitrile and vinylidene chloride-vinyl chloride.

Among the modifying resins were alkyd and phenolic resins, urea-formaldehyde, chlorinated paraffin, and chlorinated diphenyl.

Pigments investigated included antimony oxide, calcium carbonate, magnesium ammonium phosphate, titanium dioxide, and zinc borate.

And several commercial preparations recommended by manufacturers as flame-resistant coatings were evaluated for comparative purposes.

Burning and weathering tests were conducted on fabric panels, prepared according to Navy specifications, by applying 4 coats of clear and 2 coats of white-pigmented cellulose acetate butyrate dope to 4-oz. airplane fabric. Over this substrate, from 1 to 4 coats of the fire-retardant coatings were applied.

▶**Lab Trials**—Two laboratory methods were used for evaluation of burning characteristics. The "still-air" burning test involved simply the measurement

AKRON AIRPORT

INVITES

NATIONAL AIR RACE VISITORS

●

SINGLE-ENGINED CRAFT WELCOMED HERE

●

AKRON AND IT'S AIRPORT OFFER:

- AMPLE TIE-DOWN FACILITIES
- ALL GRADES OF GASOLINE
- CITY BUS SERVICE FROM PORT TO DOWNTOWN AKRON
- HOTEL ACCOMMODATIONS DORMITORY STYLE . . . FAMILY SUITES . . . SINGLES . . . DOUBLES . . . PARLOR SUITES
- CHARTER BUS SERVICE AT $2.00 ROUND TRIP BETWEEN AKRON AND AIR RACES
- GOOD AIR RACE TICKETS

SEND RESERVATIONS NOW

AKRON CONVENTION BUREAU

215 OHIO BLDG. AKRON, O.

of the time required for a flame front to move a definite distance along a horizontally supported test fabric. Later, as other coatings were developed, this test proved inadequate to differentiate among the better, self-extinguishing coatings.

Apparatus was therefore designed for a more rigorous "moving-air" burning test. In this method, a small centrifugal fan drew air through a funnel-shaped entrance port consisting in part of a doped-fabric test panel attached to the lower side of the funnel. The fire-retardant coating was applied to the upper surface of the panel. A Meker burner, adjusted to give a quiet, 9-in.-high blue flame, was placed in the airstream so that the flame lay flat on the coated surface.

In addition to measurement of the time interval between the instant of flame contact and the ignition of the dope, the time elapsing between flame contact and the charring of the underside of the fabric was also reported.

Because the air velocity measured by a small hot-wire anemometer at the center of the entrance port was only 6.5 mph., the flow was laminar, and the test conditions were highly reproducible. Standard deviation of an individual measurement calculated from 119 pairs of duplicate measurements was about 1 sec.

► **Wind Tunnel Used**—On the basis of the laboratory evaluation of the fire-retardant properties of a large number of coatings, 15 of the more promising coating systems were selected for full-scale wind-tunnel tests.

A steel wing section was suspended at the outlet of an open-type tunnel operated to provide a 70-mph. airstream.

Test panels, prepared by applying from 1 to 4 coats of fire-retardant lacquer to fabric doped with the usual 6 coats of cellulose acetate butyrate, were placed in an opening 12 in. square in the center of the wing lower surface and parallel to the wind tunnel axis.

A spray gun mounted immediately forward of the wing served to introduce a uniform spray of 90-octane aviation gasoline into the airstream.

The spray was ignited by a spark from a high-tension aircraft spark-plug and enveloped the wing section in burning gasoline, insuring continuous contact of the specimen with flame during the entire test.

► **Recording Details**—Course of the fire was recorded by a motion picture camera also aimed at a mirror placed within the wing section to permit observation of the inside surface of the panel being tested.

Observers with stop watches noted the time for the destruction of the outer coating and the time of fabric failure. An auxiliary time scale was provided by a large sweep-second electric clock placed in the field of view of the camera.

Temperatures were recorded at points within and just outside of the fabric via thermocouples and rapid-response pyrometers.

► **What Was Noted**—The tunnel tests showed clearly that it is possible to increase the time for fabric destruction from the 6 sec. characteristic of cellulose acetate butyrate to approximately 12 sec.

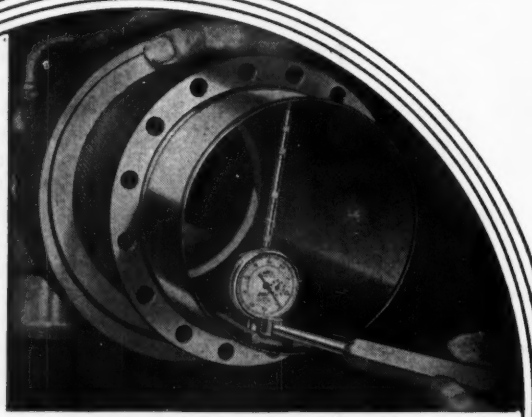
And some additional improvement can be achieved by designing the outer coating to have greater mechanical strength after burning so that it will not be blown away so easily by the windstream.

Although few of the fire-retardant coatings developed in this investigation have the flexibility and durability of the cellulose acetate butyrate dope, several are of sufficient utility to merit further development. Film-forming bases which gave the best results all have considerable organically combined chlorine, which on chemical decomposition by action of heat gives off appreciable quantities of hydrochloric acid gas.

Pigments such as zinc borate and antimony oxide were also quite effective in increasing the production of noncombustible gas.

Magnesium ammonium phosphate,

AMES



Instantly Accurately Safely . . .

GAUGE ALL AIRCRAFT CYLINDERS

Ames No. 29T Cylinder Gauge provides the *quickest, safest* means of precisely measuring aircraft cylinders. Insert gauge into cylinder—as you move handle, read *.0001" graduated dial.* It shows instantly, accurately all you want to know about diameter, straightness, roundness. No danger of scoring highly finished cylinder walls because contact pressure is extremely light, allowing gauge to be moved freely, safely in and around cylinder. Ames No. 29T Aircraft Cylinder Gauge comes in fitted metal box with full set of indicator extension points and instructions.

For details write to home office, 60 Ames Street

B. C. AMES CO. *Waltham 54, Mass.*

Representatives in principal cities

MANUFACTURER OF MICROMETER DIAL GAUGES & MICROMETER DIAL INDICATORS

The Birdmen's Perch

By *Major Al Williams*, ALIAS, "TATTERED WING TIPS,"
Manager, Gulf Aviation Department, Gulf Bldg., Pittsburgh 30, Pa.

Went to an air show.

This one was at Westchester County Airport; sponsored by the New York State Dept. of Commerce, by Westchester County, and by the airport management.

The airlines were pretty smart.

Six of them sent planes and crews up to the airport, complete with pamphlets and other literature on flying. They put loading ramps on the planes and invited the public in for a look-see. The best looking stewardesses in the business answered questions about airplanes and air travel.

And borrowing a page from barnstorming days, several of the lines filled up their planes with load after load, at $3 a head, and gave 'em many-minute hops over the area.

Between 50 and 80 per cent of the hoppers were making their first flight. But we'll bet it won't be the last flight for a heap of 'em!

We think the airlines showed a pretty keen sense of public relations in this case. We think it'll pay off, too.

We congratulate 'em!

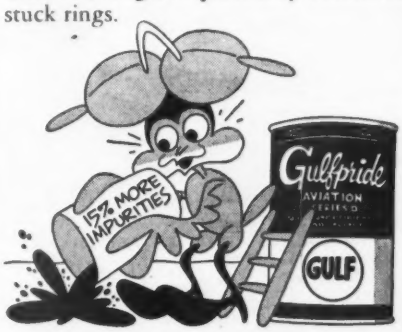
To 80% of the private pilots

The engines of 80% of U.S. private aircraft have horizontally opposed cylinders.

For these engines, the world's finest lubricant is Gulfpride Aviation Oil—Series D!

Series D cleans foreign matter from these engines, keeps it separated and in suspension. Consequently, operators who use Series D are extending overhaul periods to 1000 hours and over!

Series D frees stuck valves and keeps them free longer; it practically eliminates stuck rings.



And the name Gulfpride tells you old-timers that this super-lubricant has gone through Gulf's exclusive extra refining step, the Alchlor Process, which gets up to 15% more impurities out of already refined oil!

Don't worry about your engine being dirty . . . you can use Gulfpride Aviation Oil—Series D—in dirty engines or in clean ones.

If you put your mind to it, it shouldn't take you any more than the next 24 hours to try Gulfpride Aviation Oil—Series D—in your own lightplane engine.

What are you waiting for?

Little Known Facts Dept.

We like this Little Known Fact About Well Known Planes. And to prove it, we're sending a Commission as Perch Pilot (bottom rung) to Bill Curry, in Milledgeville, Ga.

"The AF's L-13 can take off and land in the distance covered by the B-36's wing span!

The L-13 gets off in 230' and back on in 227'. The 36 spans 230'!"

A very fancy "Fact," Bill, and wouldn't you think more guys would send proof with their contributions?

We've got files full of "no-proof" Little Known Facts which means that a lot of the fellahs are lurching through life unwept, unhonored and unsung because they haven't one of our magnificent, genuine-type commissions as Perch Pilot (br).

And the poor things'll just never be able to get the Senior Perch Pilot rating that we hand out for 5 published, *proved* "Facts."

What a pity!

All they have to do is write to us at the address above—sending *proof*—too.

Gulf Oil Corporation and Gulf Refining Company . . . makers of

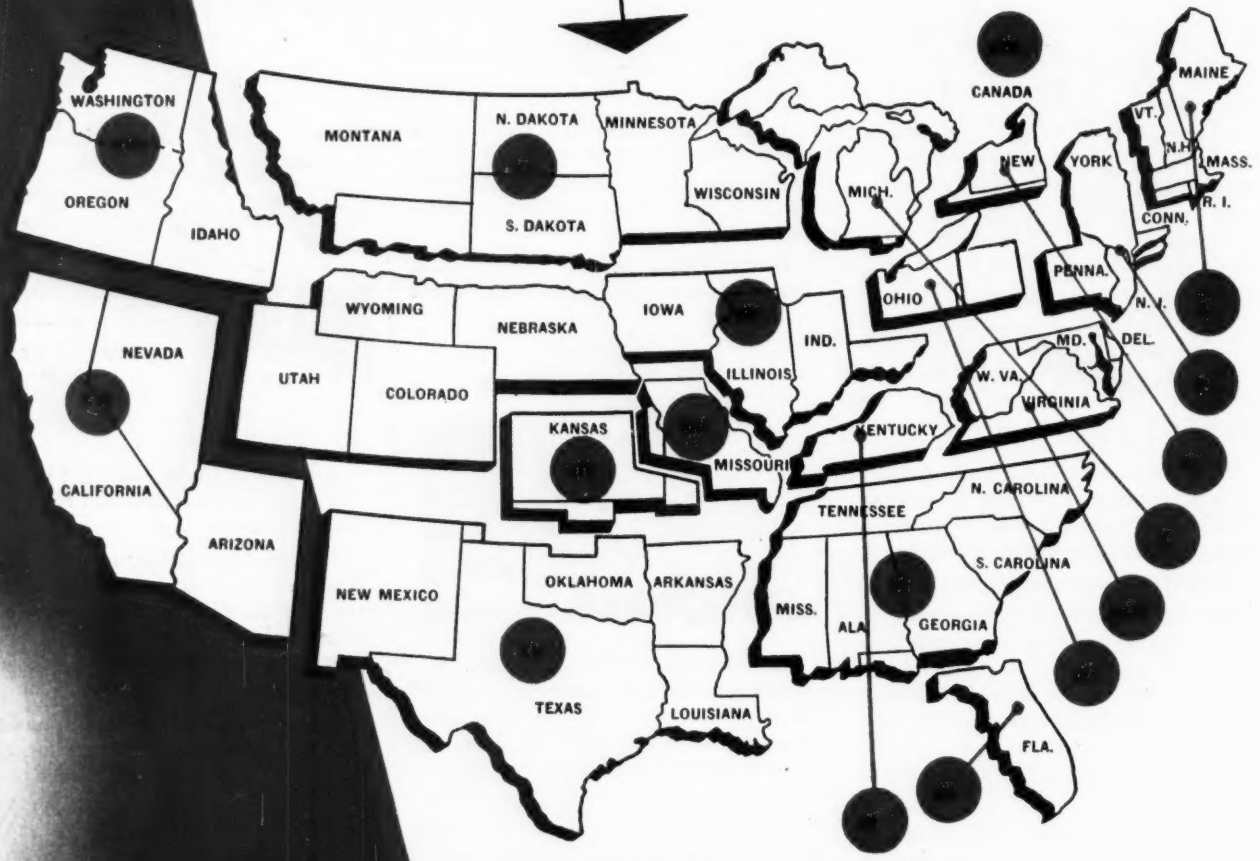
GULF **GULF AVIATION PRODUCTS**

NEXT TIME YOU'RE ON THE FIELD WILL YOU TAKE A LOOK AT YOUR FIRE EXTINGUISHER?
MAKE SURE IT'S IN FILLED, USABLE SHAPE WITH THE SQUIRT HOLE UNPLUGGED.
SKUSH!
CARELESSNESS ABOUT THIS MIGHT LOSE YOU A PLANE— AND THEN WE COULDN'T SELL YOU...
...THAT POWERFUL GULF AVIATION GASOLINE!
GULF
Millar

FACTORY SUPERVISED

ECLIPSE-PIONEER DISTRIBUTORS

At Your SERVICE . . . Everywhere!



. . . To Expedite Your Maintenance Work with Fine Aircraft Instruments and Accessories

1. Inter City Aviation
   Logan Airport, East Boston 28, Mass.
3. Buffalo Aeronautical Corp.
   Buffalo Airport, Buffalo, New York
2, 4 & 5. Standard Aircraft
   Roosevelt Field, Minneola, L. I., New York
6. Aviation Supply Co.
   Atlanta Municipal Airport, Atlanta, Georgia
7. Barfield Instrument Corp.
   3275 N. W. 42nd Avenue, Miami Springs, Florida
8. Lyder Aircraft Corp.
   5 W. 63rd Street, Chicago, Illinois
9. General Airmotive Co.
   Municipal Airport, Cleveland, Ohio
10. Kollsman Instrument Corp.,
    City Airport, Detroit 5, Michigan
11. Eisemann Magneto Corp.
    North Auto Electric Co.
    Louisville 4, Kentucky
12. Airways, Inc.
    Wold-Chamberlain Field, Minneapolis 11, Minn.
13 & 14. Standard Products, Inc.
    650 E. Gilbert, Wichita 1, Kansas
15. Southwest Airmotive Co.
    Love Field, Dallas 9, Texas
16. Pacific Airmotive Corp.
    2940 N. Hollywood Way, Burbank, California
17. Pacific Airmotive Corp.
    Boeing Field, Seattle, Washington
18. Pacific Airmotive Corp., Anchorage, Alaska
19. Aviation Electric Ltd.
    Avenue, Montreal 18, P.Q., Canada

ECLIPSE-PIONEER DIVISION OF

TETERBORO, NEW JERSEY

New York 11, New York

Bendix
AVIATION CORPORATION

LOOK FOR THE PIONEER MARK OF QUALITY
REG. U. S. PAT. OFF.

on the other hand, is too water-soluble for outdoor use.

Antimony oxide and calcium carbonate in combination appeared to be superior to antimony oxide alone.

Maximum pigment content compatible with flexibility and weathering requirements was about 40 percent of the solids. Although fire-retardancy is increased for higher pigment contents, such over-pigmented coatings are not sufficiently durable.

Low Pressure Tank Built For Export

A high altitude test chamber which simulates atmospheric conditions up to 70,000 ft. has been purchased by the Uruquayan Air Force from the Biggs Boiler Works, Akron, Ohio.

The tank is made of ½-in. welded steel plate and weighs about 30,000 lb. The decompression chamber, divided into two compartments, is 22 ft. long and 10 ft in diameter.

This chamber will accommodate 15 men on comfortable leather benches and is equipped with a vibrator to give the "feel" of actual flight conditions. Also provided are fluorescent lights, a tele-talk communication system, and an oxygen line circling the compartment and having connections for 15 masks.

Low pressures are produced by vacuum pumps powered by 15 and 50-hp. motors set-up outside the test facility. Two sets of dials on the outside and three inside indicate rate of climb and the altitude. Five portholes of heavy extra-strength plate glass enable observers to watch the men inside.

Entrance to the tank is through a 1½ in.-thick steel door sealed with heavy rubber. This door opens into a shallow outer compartment closed-off from main test chamber by an inner door. Outer compartment prevents air from leaking into second chamber and destroying vacuum when pilots enter and leave the tank.

Already on its way down to South America, the tank took three months to build and is the 16th constructed by Biggs since it started making them in 1930.

Tests Altimeters

High precision aneroid indicator has been developed by Wallace & Tiernan Products, Inc., Belleville 9, N. J., for calibrating and testing aircraft altimeters. Range of unit is —1000 to 30,000 ft. altitude, with 10-ft. graduations in low altitude range. Instrument has 8½ in.-diameter dial with 45 in.-scale. Sensitivity and accuracy are respectively 1/100 and 1/10 of 1 percent. Device is temperature compensated.

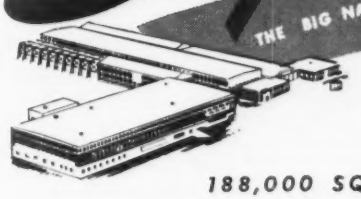
Every design engineer and production man interested in the many uses of hydraulic tubing will find Superior Bulletin #38 a useful, authoritative compilation of basic data.

Specific sections of the bulletin cover analyses, size ranges, lengths and tempers of Superior Hydraulic Tubing. Other sections give important facts on test procedures and the maximum working pressures of the tubing.

See Our Tubing Exhibit Booth No. 2527 • National Metal Exposition • Cleveland, Ohio • October 17-21, 1949

Superior

THE BIG NAME IN SMALL TUBING (.010" TO 5/8" O.D. MAX.)



SUPERIOR TUBE COMPANY
2030 Germantown Ave., Norristown, Pa.

For Superior Tubing on the West Coast, call PACIFIC TUBE CO., 5710 Smithway St., Los Angeles 22, Cal. • ANgelus 2-2151

188,000 SQ. FT. PRODUCING METAL TUBING

Best Small Amphibian in Europe

Italy's Piaggio P. 136 gull-wing, twin engine amphibian has been rated by some observers at the recent Paris Air Show (AVIATION WEEK, May 30) as probably the best-designed aircraft of its type on the Continent.

Built by Piaggio & Co., Genoa, a firm which has been in the business since 1915, the new five-place plane is said to exhibit a standard of design and workmanship up to the mark of contemporary American models.

▶ **Luxurious Seating**—The clean-looking amphibian will carry five persons with 330 lb. of baggage. Cabin has a large rear seat accommodating three people, and two separate forward seats. A luggage compartment is located aft of the cabin. Dual controls and instruments for night and bad weather flying are provided. An oversized door on each side permits easy entarnce and exit to both rear and front-seats. A sea anchor, which can be handled by opening the port windscreen, is stowed in front of the pilot in a small compartment on top of the nose. Piaggio plans to replace the closed-in cabin roof with a transparent panel on production models.

The two pusher-engines mounted at the extremities of the center section and located above and aft of the occupants, leaves the cabin relatively quiet. Interior is claimed to have ample legroom, good visibility and to be pleasingly decorated in dark green fawn and cream colors.

▶ **Construction Details**—The hull is a two-step design having a sturdy keel and is built-up conventionally with metal formers, longerons and stringers, covered with riveted aluminum-alloy sheeting.

Hull center section supports main landing gear and contains a cylindrical fuel tank. Landing gear retracts into side pockets located well above the water-line. Tail wheel is externally retracted upwards for water operations.

A main freight hold is located to the rear of the center section. It is pointed out that care may have to be exercised in loading the 136, since freight area is well aft of the center of gravity.

The wing is a two-spar structure covered with riveted aluminum alloy sheeting. Gull-wing configuration is aimed at keeping props well above the water line. Slotted flaps are used, two inboard and two outboard of each engine nacelle. Tail assembly is all-metal construction with vertical fin and horizontal stabilizer covered with metal skin. Rudder and elevators have fabric surfaces.

The two 215-hp. Franklin "500" air-cooled engines drive Hartzell HC-12x20 two-blade, variable-pitch propellers through normal shaft extensions. Engines are mounted between the front and rear spars at the knuckle joint of the gull wing.

Since there reportedly are few amphibians made in Europe to offer competition, the P. 136 is seen to have a hopeful future. One possible hitch, however, may be that the price will be out of reach, because American-made Franklin engines which power the craft have to be bought with scarce dollars.

P. 136 Amphibian Specification Data

Dimensions	
Span	43 ft. 11⅜ in.
Length	35 ft. 5½ in.
Height (wheels on ground)	11 ft. 5¾ in.
Cabin width (inside)	5 ft.
Wing area	258.3 sq. ft.
Weights	
Empty	3750 lb.
Useful load	1750 lb.
Gross	5500 lb.
Performance	
Maximum speed, sea level	175 mph.
Maximum speed, 6100-ft. altitude	165 mph.
Cruising speed, 60 percent power @ 9200 ft.	155 mph.
Landing speed, flaps down	70 mph.
Rate of climb, sea level to 3050 ft.	871.5 fpm.
Range, 990 lb. payload @ 4900 ft. @ 150 mph.	400 mi.
Ceiling at normal rated power	16,700 ft.
Ceiling with one engine inoperative	4900 ft.

ENGINEERING FORUM

On Refueling

Member of first crew to experiment with air technique outlines trials.

Recently I read an article on "Flight Refueling" in AVIATION WEEK, Feb. 21, 1949. I am one of the original members of the world's first crew to perform airplane-to-airplane in-flight refueling; being the Lt. Richter mentioned in your article. I desire to correct some erroneous statements, ideas and conceptions which have been published, quoted and generally believed by a number of persons.

Our original experiments, officially approved, were conducted (with one exception) near Rockwell Field, San Diego, Calif., during the spring, summer and fall of 1923 (not 1924). Rockwell Field, at that time was commanded by Major H. H. Arnold (now General).

The work was performed as an experiment and not as a "stunt" as referred to by numerous contemporaries, as well as by other well meaning but ill-advised writers, both then and now.

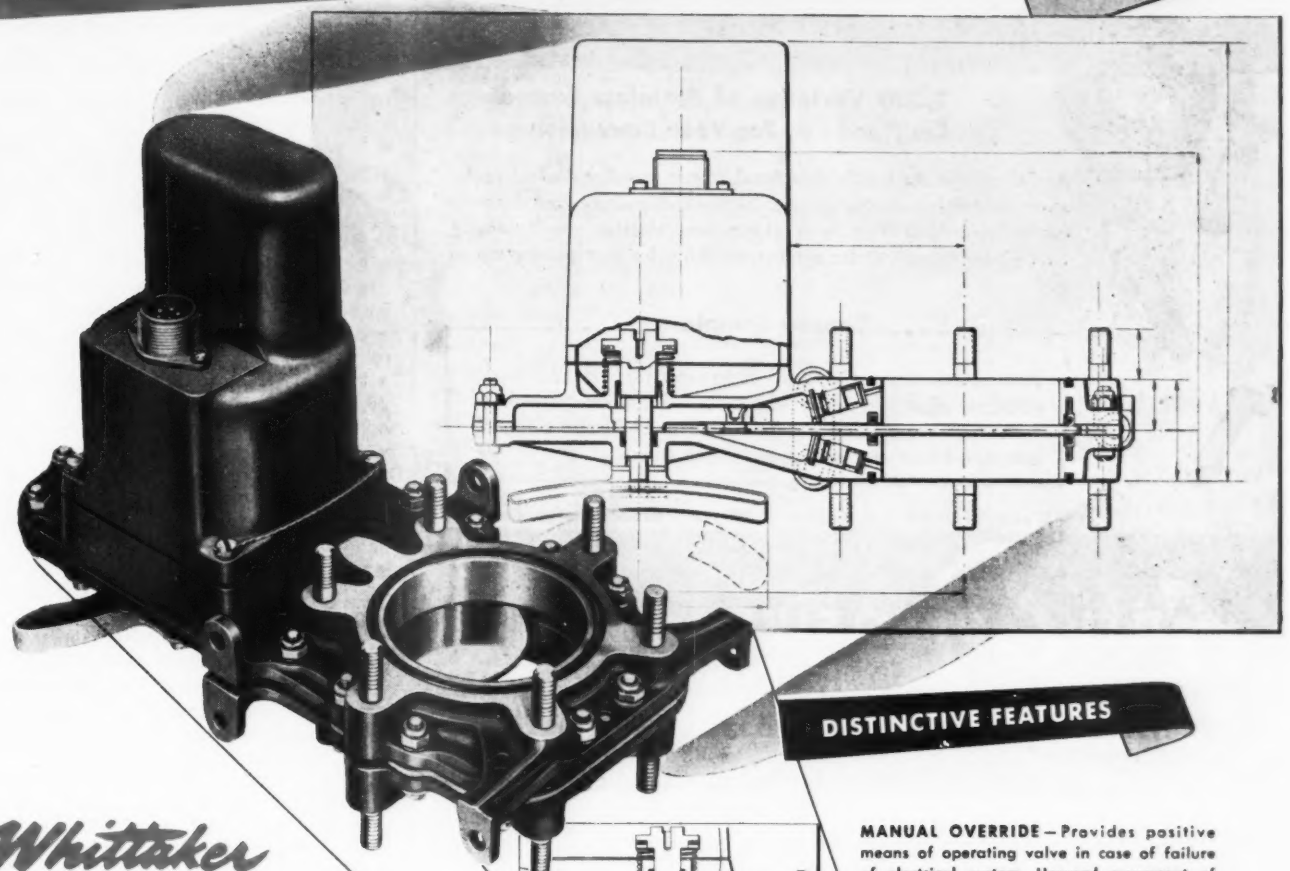
Our small group of workers then (1923) visualized and looked forward to the practical application of flight refueling and supplying as seems to be developing during the present era.

The airplane used during the experiments were two-place, open-cockpit, single-engine, Army DH-4Bs, observation type. The special equipment used and methods of operation were basically the same as those used during all refueling flights since that time, as well as those described at some length in the aforementioned article.

Of course, as the development of larger and better airplanes has proceeded, so have the detail technical installations and operations of air refueling progressed.

Now we have available space for mount-

PROJECTED . . . INTO THE FUTURE



Whittaker

3" and 4" MOTOR SLIDE VALVES . . . *Engineered for Single Point Fueling . . .*

WHITTAKER'S versatile engineering staff is constantly developing new designs to meet the everchanging requirements of the aircraft industry. Typical of these developments is the new WHITTAKER line of motor slide valves for in-flight refueling. Here are 3" and 4" shut-off valves that incorporate all of the flight-proven advantages of WHITTAKER motor-operated slide valves, yet are individually engineered to meet the specialized requirements of single point fueling systems. They safely handle flows up to 600 gallons-per-minute. WHITTAKER'S exclusive "contour seal" assures a positive-acting, non-binding seal with straight-through, unimpeded flow when open; and clean-cut, drop-tight sealing when shut. Special unique override permits either power or manual operation of valve. These are but a few of the many outstanding advantages of WHITTAKER 3" and 4" shut-off valves. For air-to-air refueling systems, specify WHITTAKER single point fueling valves—the newest addition to the WHITTAKER line. WM. R. WHITTAKER CO., LTD., 915 North Citrus Avenue, Los Angeles 38, California.

DISTINCTIVE FEATURES

MANUAL OVERRIDE—Provides positive means of operating valve in case of failure of electrical system. Upward movement of manual override handle disconnects slide operating mechanism from actuator assembly.

CONTOUR SEAL—Exclusive Whittaker metallic seal provides a positive-acting non-binding seal with life from 10 to 20 times that of ordinary rubber seals. Metallic seal permits dry cycling without damage to seal.

THERMAL RELIEF VALVES—Built-in thermal relief valves protect slide against excessive fluid pressures caused by thermal expansion of fluid in line.

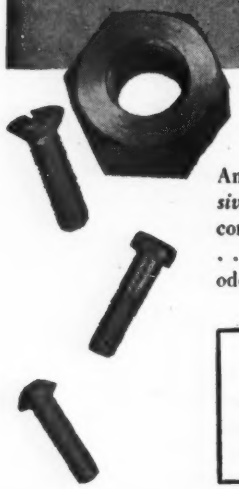
Whittaker

First IN DESIGN

First IN PERFORMANCE

First WITH VALVES THAT ARE FIRST CHOICE IN INDUSTRY

Anti-Corrosive
STAINLESS STEEL FASTENINGS
DO THE JOB Better



7,000 Varieties of Stainless Fastenings On Hand . . . For Your Convenience!

Anti-Corrosive, America's oldest and largest supplier dealing *exclusively* in stainless fastenings, carries this tremendous stock for your convenience (including most government aviation specifications) . . . plus a special order service available for fast production of odd sizes.

Choose Stainless

Non-corrosive, non-magnetic, impervious to heat and cold, stronger, safer and better looking . . . no wonder stainless fastenings are playing a bigger part daily in the aviation industry. Make your next specification stainless!

Write TODAY for Folder E-49 for Further Information!

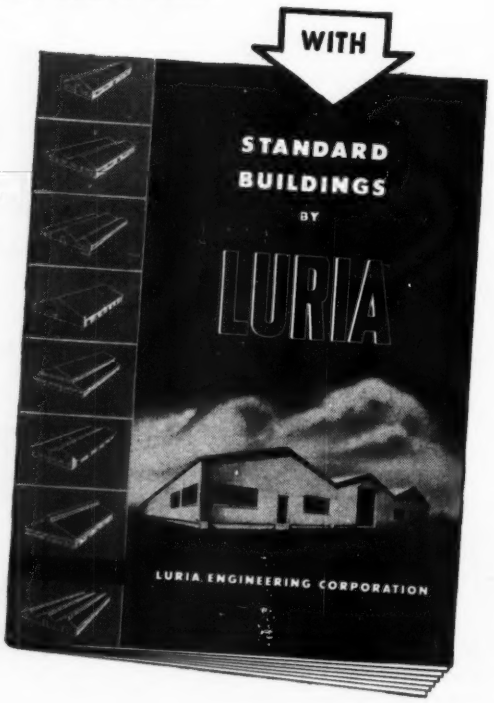
Anti-Corrosive
Metal Products Co., Inc.
Manufacturers of STAINLESS STEEL FASTENINGS
CASTLETON-ON-HUDSON, NEW YORK

If your airport needs more building space, chances are you can get it faster, easier and at lower cost

Whether you need a new administration building or a hangar, Luria has the answer. For, in addition to the well-known line of Standard Hangars, Luria now offers you a practically unlimited selection of low-cost, *permanent*, steel-frame structures that are ideal for all types of airport buildings. And, like Luria hangars, they're *available now.*

SEND FOR YOUR COPY
of this new 20-page
catalog today

LURIA ENGINEERING CORP.
Dept. A10, 500 Fifth Avenue
New York 18, New York



ing power-operated windlasses, tail intake of refueling hose, and numerous other gadgets. We "dreamed," in the old days, of such airplanes, but with our cramped-quartered, single-engine planes, we probably thought of, and tried out, more gadgets and procedures than the present day experts ever realized . . . Many check and test flights of airplanes and equipment were made. Following are some of the principal flights:

- **Apr. 20, 1923:** First experimental flight ever made during which a gasoline hose was connected from one airplane to another. Duration was 40 min. No gasoline was delivered, since this was purely a trial.
- **May and June 1923:** Numerous test flights conducted, during which equipment and the passing of fuel, etc., were tried out.
- **June 27, 1923:** Refueling flight, 6 hr., 39 min.
- **June 28-29, 1923:** Refueling flight, 23 hr., 48 min.
- **July and Aug. 1923:** Numerous test flights.
- **Aug. 27-28, 1923:** Refueling flight, 37 hr., 15 min., 14⅘ sec. This flight established 14 world records.
- **Sept., 1923:** Test flights and preparation of equipment.
- **Oct. 25, 1923:** Refueling flight, Canada to Mexico, 12 hr., 13 min., 40 sec. Refueled at two places.

Although permission was requested, to make a coast-to-coast refueling flight, authority was not obtained. Our little group of refueling "experts" was soon broken up by the transfers of some of the personnel to other duties . . .

Here is a partial list of the personnel who participated in most of the refueling flights and tests: Maj. H. H. Arnold, Commanding Officer, Rockwell Field, San Diego, Calif.; Lts. Lowell H. Smith and John P. Richter, crew of receiver airplane; Lts. Virgil Hine and Frank W. Seifert, crew of tanker airplane No. 1; Capt. R. Gilpin Erwin and Lt. O. McNeel, crew of tanker airplane No. 2; Mr. H. A. Erickson, official photographer; mechanics and helpers comprising officers, enlisted men and civilian employees of Rockwell Air Depot; and timekeepers and on-course observers comprising officials and representatives of the contest committee of the NAA.

Should anyone doubt the authenticity of these statements, or desires further details, I list the following references:

- All San Diego newspapers published during 1923, when the refueling flights were made; especially the San Diego Union.
- Report of Official World Records, recognized by the International Aeronautic Federation, dated Jan. 1, 1924; translated and compiled by the Contest Committee of the NAA.
- Records Officiels Der Monde on 1er Octobre, 1924, Federation Aeronautique Internationale.
- History of Rockwell Field, 1923, by Maj. H. H. Arnold.
- The San Diego Union, Dec. 30, 1928 and Gerald F. MacMullen.
- Mr. Max Miller, San Diego.
- U. S. Air Services (magazine), January 1924, Vol. 9, No. 1.
- Bunnel Photo Shop, San Diego, photographs.
- H. A. Erickson, San Diego, photos.

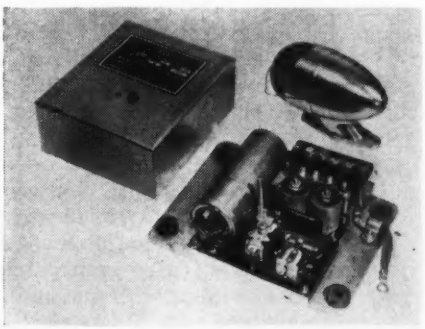
J. P. Richter,
Carlisle, Pa.

NEW AVIATION PRODUCTS

Better Brush Action

Brush stabilizing mechanism for fractional hp. motors, which counteracts wedging effect of commutator and permits brush to ride freely in its holder, has been developed by **General Electric Co.**, Schenectady, N. Y.

Device involves use of angular brush top and addition of bracket to seat on angle. In this way, brush spring pressure is partially resolved into horizontal component which corrects wedging, thus improving commutation and increasing brush life. A roller, which has been added to bracket, is designed to assure close following of brush on commutator, resulting in improved commutator life. Units are designed to interchange with standard mechanisms as outlined in the National Electrical Manufacturers Assn.'s standardization of series-wound motor parts.



Flashes Plane Lights

"Blink-R" relay box, made by **Airlectron, Inc.**, Caldwell, N. J., for flashing navigation lights on private planes, is offered by **Van Dusen Aircraft Supplies**, Teterboro Air Terminal, Teterboro, N. J. Unit is available in 12 or 24v. models, weighs 22 oz. installed and incorporates noise filters to suppress radio interference. Dimensions are 6 × 4¼ × 2 in.

Removes Spillage

For removal of oil, grease, soluble oil, kerosene and gasoline from floors of factories, maintenance depots and hangar areas, "Kwixorb," non-inflammable, granular absorbent, offered by **Pennsylvania Refining Co.**, 2686 Lisbon Rd., Cleveland, Ohio, picks up spillings in excess of own weight and acts as chemical blotter.

Company states that even when saturated with oil, product will not support combustion and is unaffected by acids or alkalis.

Product is represented to eliminate 98 percent of hazards from slipping on oil or grease by personnel.

Easily Applied Solder

Useful item for aircraft emergency repair kits or where very low temperature soldering is desired, is "De Luxe Ribbon Solder." It requires no additional flux and can be applied with ordinary match.

Offered by **Proved Products Mfg. Co.**, San Fernando, Calif., material also can be used with soldering iron or torch. It is represented to be especially useful for soldering close to low-melting plastic insulation (**coaxial** cable), and for aircraft wiring, sheet-metal work, and instruments. It has coating of flexible, non-corrosive, rosin flux, is stated to give neatness, strength and penetration to connections, and reportedly leaves no waste or excess.

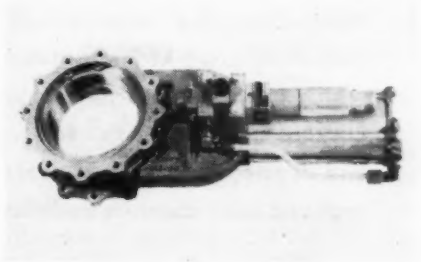
To join small wires, about ¼ in. of solder ribbon simply is wrapped around splice and melted with match. For wire exceeding 14 gage, ribbon is wrapped in spiral manner and can be melted with iron, cigarette lighter or candle. Material reportedly will join any metal where tin-lead solder can be used—copper, brass, tin, etc. It is ⅜ in. wide, comes in 10-ft. lengths (100 ft. to box).

Cleans Small Parts

Completely automatic parts cleaning device, offered by **L & R Mfg. Co.**, 577 Elm St., Arlington, N. J., is represented to be especially helpful in cleaning small instruments, gages, ball-bearings, electronic units, etc.

Device is furnished with assortment of baskets, dividers and inserts for holding parts, and company's cleaning and rinsing solutions. Parts are placed in basket, attached to reversing motor shaft, and automatically routed through cleaning jar, two rinse jars and drying chamber in 12-min. cycle.

Motor gives continuous reversing of baskets in solution only. One-direction rotation is used for spin-off, above solution level in each jar, and in drying chamber using motor-driven fan.



Air Refueling Aids

High capacity shut-off valve (shown) designed for safe and speedy air-to-air refueling has been announced by **Hydro-Aire, Inc.**, Burbank, Calif. Valve accommodates 4 in.-line permitting delivery of fuel at 600 gal./min. Unit is said to have 1/10 sec. time lapse between open and closed positions or vice versa.

Other Hydro-Aire in-flight fueling units are pressure relief valve, which protects lines from surge and water-hammer pressures created by fast shut-off of 600 gal./min. flow, and flapper check valve with 4 in.-opening, designed to give fast action control of fluids. Company claims valves are adaptable to many other applications.

FOR *SURE-FIRE* PERFORMANCE . . .
FOR ALL TYPES OF PLANES

there's more HPR* in PACKARD high-altitude aircraft IGNITION CABLE

You can count on Packard ignition cable for more hours per replacement—because extra endurance is built right into it. Added HPR* are the natural result of Packard design and manufacture. Here is cable in which are combined all the know-how and specialized skills that Packard has gained through years of leadership in cable progress and development. Here is cable possessing unequalled resistance to heat and cold, moisture and abrasion, age and corona.

For extra hours of sure-fire ignition, for maximum reliability under all atmospheric conditions, from sea level to ceiling . . . in all parts of the world . . . specify Packard high-altitude ignition cable.

*Hours Per Replacement

Packard
REG. U. S. PAT. OFF.
TRADE MARK

PACKARD ELECTRIC DIVISION, General Motors Corporation, Warren, Ohio

PRODUCTION

Job Evaluation Trends Studied

Survey of seven Long Island aviation plants indicates growing usefulness of system that started during war.

Job evaluation in the Long Island, N. Y., segment of the aircraft industry has survived the war to the satisfaction of the companies using it. Indications are that it will continue with modifications.

A recent survey by William Schweizer, formerly of Schweizer Aircraft Corp., Elmira, N. Y., and now teaching industrial management at the Long Island Agriculture and Technical Institute, disclosed two distinct systems of job evaluations used by five of the seven leading manufacturers of airframes and accessories from whom firsthand information was obtained.

The study was made, according to its author, to give management a factual picture of the extent to which job evaluation is employed, what systems are used, and what future trends may be expected in the industry's wage determination process.

▶ **Well Established**—Schweizer reached these conclusions:

• Job evaluation is well established in most of the companies surveyed and is no longer a wartime measure to correct wage inequities in a rapidly expanding industry.

• Companies using the point system are well satisfied, for the most part, with its effectiveness for factory, clerical and technical non-supervisory jobs. Tendency now is to expand it to top supervisory levels.

• Some type of job evaluation system (preferably based on analyzed judgment, like the point system) appears necessary where a union is involved, to put management in a defensible position in terms of pay for the related jobs.

• Weakest point in the formal wage determination system is merit rating. Job evaluation determines the relative value of jobs, while merit rating shows the relative value of individuals on the job.

▶ **Two Systems**—Two distinct systems of job evaluation are in use at five of the companies surveyed. Two others, the largest and the smallest, did not have any formal plan.

Of those using it, four used the point system (individual job breakdown and analysis) and the fifth used the ranking system (total job evaluation in relation to other jobs involved).

Three of the four using the point system are employing the National Metal Trades Assn.'s job rating plan. One firm has developed its own methods.

Merit rating, in all cases, was disclosed as the most vulnerable component, for as the report points out, "when people rate each other almost anything can happen." Several firms were found to be waiting for a more objective approach to the problem.

▶ **Grumman Objects**—Objections to the job evaluation principle came from Grumman Aircraft Engineering Corp., largest of the seven surveyed. Grumman gave these reasons for not having a job evaluation plan at its Bethpage plant:

(1) The company believes people want to be treated as individuals and do not like to be classified.

(2) The aircraft industry is a low quantity production industry which has great variety in its tasks for factory personnel. Moving classified employes from job to job creates supervision and wage administration problems.

(3) One of management's policies is to eliminate as much regulation as possible, and a job evaluation program would not fit into this philosophy. At present, Grumman does not have a set of company rules.

(4) Prewar wage freezing put aircraft companies in a poor competitive position in the labor market. Grumman has met this problem with an incentive bonus shared by everyone and based on the man-hours required to build a pound of airplane.

(5) Grumman, which has no union, enjoys good labor-management relations. And it considers its position favorable in a competitive labor market.

• **B. H. Tried Plan**—B. H. Aircraft Co., Inc., at Farmingdale—also without a system—told Schweizer that it tried a job ranking system installed by an outside consultant during the war.

Management, in addition to finding much the same objections as Grumman, was dissatisfied, feeling the plan was not tailored to the company's individual need. A union contract violation and resulting decertification of the union made discontinuance possible in 1947.

B. H. also has an incentive bonus, based on overall production, paid quarterly to everyone but executives.

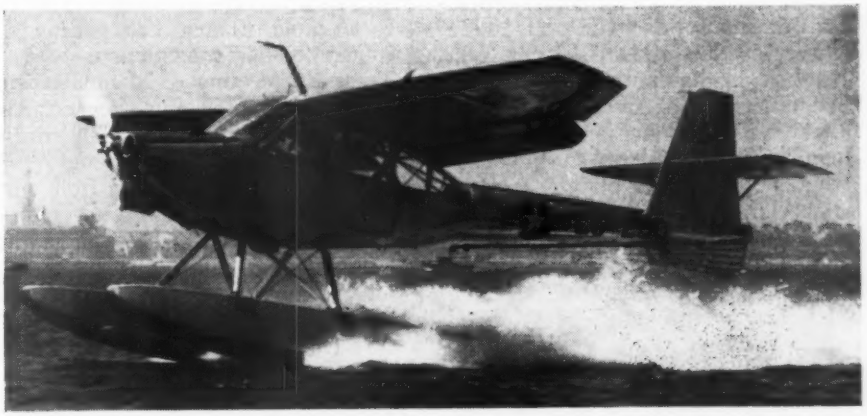
• **Liberty Has One**—Liberty Aircraft Products Corp., Farmingdale, unionized after the war and installed a job ranking system in 1948.

Management told Schweizer that jobs, after study, were slotted into nine grades on the basis of the following factors: relationship to other jobs in the company, community rates and relationship of similar jobs in three points systems.

With union cooperation, Liberty has developed general descriptions which permit the re-engineering of jobs and their conversion to meet the changing demands of a low production industry.

• **Republic and NMTA**—Republic Aviation Corp., another Farmingdale firm, uses NMTA point systems for both factory and salary personnel, and recently expanded their point plan to include top supervisory and executive levels. The survey shows that Republic executives have willingly accepted their inclusion in the plan and show more interest than factory workers in their classification and rating.

Although merit rating, as part of the plan, was abandoned after the war, Republic still feels the necessity for com-



SEAGOING L-13

Equipped with Edo floats, seaplane version of Convair liaison plane skims across San Diego Bay during initial water trials. Ventral fin has been added.

petitive grading. Thought is being given to a simplified merit rating system which could be coordinated with a seniority factor. This is a departure from the conventional tie-in with job evaluation.

• **Edo Satisfied**—Edo Aircraft Corp., on the other hand, is satisfied with merit rating. Proper and continual education of supervisors, according to the company at College Point, is the answer to its success with the plan.

One large company, which asked to remain anonymous, developed its own job evaluation system after careful study of existing plans with a view to combining their desirable aspects with the company's own experience.

Company and union representatives worked together for two years to evolve the program. Merit rating is not used. This large company is interested in finding a criterion for the rater to determine whether he rates high or low in relation to other supervisors.

The company, which has a single rate structure for factory jobs, applies the principles of seniority to promotions and upgradings when knowledge and ability are relatively equal.

PRODUCTION BRIEFING

▶ **Aircraft Industries Assn.** west coast office is moving Sept. 1 to 7760 Beverly Blvd., Los Angeles, in the Institute of the Aeronautical Sciences building.

▶ **Munitions Board** has ordered that all military specifications hereafter will be unified in a single series designated "mil specs," and applying to all three NME departments. They will replace the current AN (Army-Navy) aeronautical specifications. Munitions Board standards agency is in charge of the redesignation program.

▶ **Edo Corp.**, College Point, L. I., shipped two sets of floats for use on Auster Mark V four-place planes carried on a British government ship for use in a survey of the Falkland Islands, near Argentina, in the South Atlantic.

▶ **Aluminum Co. of America** established a new marketing division, headed by Hugo T. Wilder, assigned to study marketing methods, sales outlets, conduct market surveys and supervise sales statistics.

▶ **Handley Page's** new turbo-prop-engined airliner, the Mamba Marathon which flew recently, will be exhibited for the first time at the Sept. 7 Farnsborough aircraft display of the Society of British Aircraft Constructors.

▶ **Westinghouse Electric Corp.** let a $1,690,637 contract for construction of its new laboratory and office building for its atomic power division, at the site of the old Bettis Field Airport, Pittsburgh. Westinghouse already has the division in operation in hangars and other buildings that were part of the airport facilities. Atomic Energy Commission is financing the new construction.

▶ **Texas Engineering & Manufacturing Co.** received an order from Ecuador Air Force for approximately $10,000 worth of spare parts for C-47, PT-19 and AT-7 airplanes. Parts are obtained from surplus or dismantled aircraft and factory reconditioned in TEMCO shops at Dallas.

▶ **Utica (N. Y.) Drop Forge Co.** reports a revision in a jet engine component contract with the USAF has resulted in layoff of about 125 men in the precision forging division, and dropping a third shift.

▶ **First three contracts** in a series for constructing and equipping the new $221,750,000 Naval Aeronautical Turbine Laboratory at Trenton, N. J. have been awarded. Atmospheric equipment will simulate altitudes to 65,000 ft., blowers will provide equivalent of 700-mph. speeds and refrigerating equipment will supply temperatures as low as minus 67 deg. F for tests.

▶ **Air Force-Navy-Industry Conference,** in Washington, recently agreed on machine screws requirements that specification AN-S-52 should contain requirements for aircraft high-strength structural machine screws only, and requirements for the ordinary general purpose screws should be carried under Federal specification FF-S-91.

▶ **John K. Northrop,** chairman of the NACA Industry Consulting Committee has asked for nominations of outstanding industry technicians who will serve on various NACA committees and subcommittees. Aircraft Industries Assn. is preparing nominations.

Latest Air Force Bid Awards

Air Materiel Command procurement Division makes available to AVIATION WEEK the latest bid awards, shown on this page. Requests for further information should be addressed to Contracting Officer, AMC, Wright-Patterson AFB, Dayton, Ohio, attention: MCPPSX72.

ABSTRACTS

For voltohmeters (49-2398):
Companies sharing—General Electric Co., Schenectady, on a bid of $4404.25; Gray Instrument Co., Philadelphia, on a bid of $1070; Caroled Co., Inc., New York, on a bid of $2268; Simpson Electric Co., Chicago, on a bid of $374; Firestone Tire & Rubber Co., Akron, on a bid of $103.68; W. M. Welch Mfg. Co., Chicago, on a bid of $1290; Hickok Electrical Instrument Co., Cleveland, on a bid of $2118.69, and Reiner Electronics Co., Inc., New York, on a bid of $16,888.93.

For bomb shackles (49-2450):
Jumbo Steel Products Co., Azusa, Calif., on a bid of $122,441.95.

For cameras (40-2261):
Bolsey Corporation of America, New York, on a bid of $90,904.62.

For office equipment (49-1696):
Companies sharing—Security Steel Equip. Corp., Avenel, N. J., on a bid of $39,301.40; McConnaughey Stationers Inc., Springfield, O., on a bid of $27,757; Eugene Dietzgen Co,. Chicago, on a bid of $20,184.35, and Browne-Morse Co., Muskegon, Mich., on a bid of $18,243.

For milliammeters & compasses (49-2146):
Companies sharing—Weston Electrical Instrument Corp., Newark, on a bid of $9,415.16, and W. M. Welch Mfg. Co., Chicago, on a bid of $800.50.

For wrench, reamer, etc. (49-2105):
Companies sharing—Aircraft Mechanics, Inc., Colorado Springs, on a bid of $3983; Pan-American Tool & Machine Corp., Dayton, on a bid of $340; Stevens Walden, Inc., Worcester, on a bid of $490, and Acromatic Tool Co., Detroit, on a bid of $3850.50.

For lamp assemblies (49-2112):
Companies sharing—Manhattan Lighting Equipment Co., Inc., New York, on a bid of $2298; Carlisle & Finch Co., Cincinnati, on a bid of $4270; Westinghouse Electric Supply Co., Dayton, on a bid of $11,050; Arts Specialty Co., Chicago, on a bid of $2643.75, and E. B. Latham & Co., New York, on a bid of $1504.

For clothing (49-2324):
Companies sharing—United States Safety Service Co., Kansas City, Mo., on a bid of $1190; Dunn Products, Chicago, on a bid of $300; Olympic Glove Co., Inc., New York, on a bid of $220; Acme Safety Products Co., Akron, on a bid of $1475; Anchor Rubber Co., Dayton, on a bid of $1498; The American Industrial Safety Equip. Co., Div. of the Burdett Oxygen Co., Brooklyn, on a bid of $630.60, and Welsh Mfg. Co., Providence, on a bid of $405.

For photographic equipment (49-1421):
Companies sharing—Charles Beseler Co., Newark, N. J., on a bid of $225; Graflex, Inc., Rochester, on a bid of $3165; Williams, Brown & Earle, Inc., Philadelphia, on a bid of $68.40; The FR Corp., New York, on a bid of $3841, and Camera Equipment Co., New York, on a bid of $843.75.

For amplifier modification (49-2424):
Stewart-Warner Electric Div. of Stewart-Warner Corp., Chicago, on a bid of $74,104.77.

For photographic equipment (49-1535):
Cameraflex Corp., New York, on a bid of $14,123.60.

For 1430 segregator & screen assemblies (49-2070):
Moore-Eastwood Co., Dayton, on a bid of $91,419.80.

For regulators (49-2058):
Companies sharing—Lindberg Engineering Co., Chicago, on a bid of $29,130; Hevi-Duty Electric Co., Milwaukee, on a bid of $23,720, and General Electric Co., Schenectady, on a bid of $65,748.

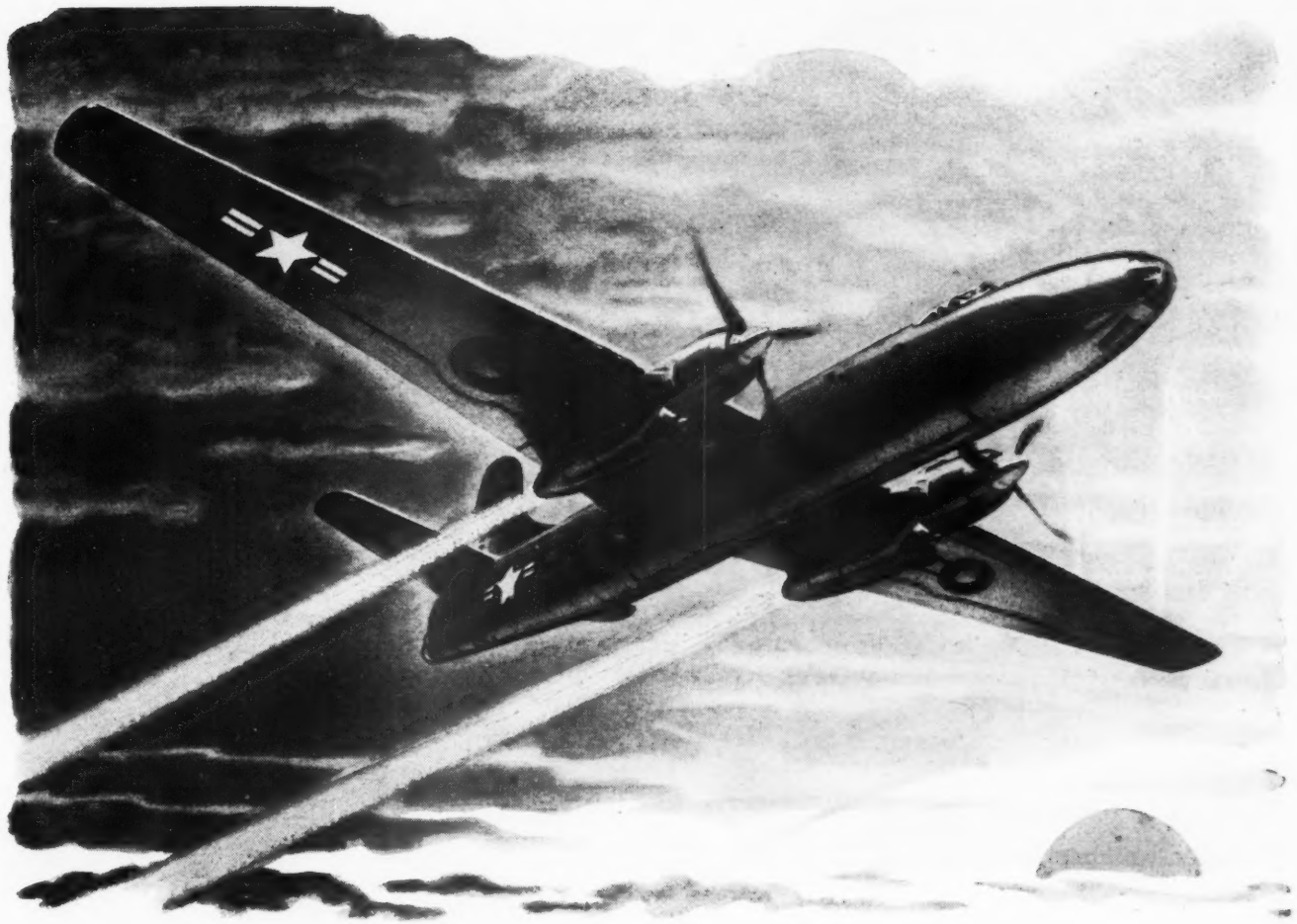
For 398,054 feet wrought iron pipe (49-2489):
American Radiator & Standard Sanitary Corp., Springfield, O., on a bid of $1,035,101.19.

For test unit assemblies (49-1507):
Companies sharing — Greer Hydraulics, Inc., Brooklyn, on a bid of $2533.56, and Pacific Airmotive Corp., Burbank, on a bid of $103.56.

For film magazine (49-2288):
Ryan Industries, Inc., Detroit, on a bid of $447,014.26.

For 464,570 pounds aniline, alcohol, etc. (49-2471):
Companies sharing—Braun Corp., Los Angeles, on a bid of $53,331.96; R. M. Hollingshead Corp., Camden, N. J., on a bid of $3200, and Octagon Process Inc., Brooklyn, on a bid of $43,196.79.

For envelopes (49-1724):
Companies sharing — Everybodys Office Outfitters, Inc., Dayton, on a bid of $21,315, and The Miami Stationers, Inc., Dayton, on a bid of $1080.



NOW- Jet Power for Patrol Planes

The speedy Martin Mercator patrol plane seeks out its quarry over long distances. Flashes in like a skilled boxer. Slams home its slugger blows. Then lights out at top speed. Most elusive aircraft of its kind ever built, this Navy patrol plane has fighter-type maneuverability—with a high rate of roll—a high rate of climb—and a quick response to controls unusual for a plane of its size and carrying capacity!

Its 20 mm. turrets and other armament make it a powerful offensive and defensive weapon. It has the cruising stamina to find its target and return over long distances. Two reciprocating engines for economical long-range power—and two jets for extra bursts of speed—are uniquely teamed in two nacelles. The Martin P4M Mercator is the first jet-powered patrol airplane— another first in a long line of great Martin planes that have strengthened our Navy's air arm! The Glenn L. Martin Company, Baltimore 3, Md.

Martin
AIRCRAFT

Builders of Dependable Aircraft Since 1909

Only 35 minutes to Broadway

CITIES SERVICE

It's all here! Everything any private or corporation flyer needs in the way of perfect facilities for inbound—outbound New York City air traffic.

Score up the Linden Airport as the finest, most conveniently located major air field under private management in the New York City metropolitan area. Ably managed by Robert Meyer, President of Skyservice, Inc., the Linden Airport has complete modern facilities. Three well-paved runways. (NW SE 2800′, N-S 3000′, E-W 4150′) 80,000 square feet of heated hangar space. A tie-down apron 900′ long and 400′ wide. Plus complete CAA approved facilities for major and minor aircraft engine, instrument and propeller repair work.

There's never a landing fee, and you'll find it as convenient as it is economical to store your plane at Linden. Be sure to make Linden Airport your stopover point when visiting in the New York area. Three major bus lines pass the door, plus Pennsylvania rail connections direct to New York.

Cities Service Aviation Gasolenes
Cities Service Koolmotor and
Cities Service Aero Oils
Cities Service Cisco Solvent Engine Cleaner
Cities Service Aero Greases and
Aviation Specialty Lubricants

CITIES SERVICE

AVIATION PRODUCTS

New York • Chicago • In the South: Arkansas Fuel Oil Co.

NEW MEMBER of CAOA, Bill Odom (left) gets certificate from William B. Belden.

Report on Use of Business Planes

Corporation Aircraft Owners Assn. meeting hears problems of operation and studies extent of use.

American business firms are currently using about 7200 airplanes for industrial travel, it was estimated at the Corporation Aircraft Owners Assn. forum in Washington last week. This includes 1200 multi-engine and 6000 single-engine planes.

Robert Aldrich, director of the Minneapolis-St. Paul Aviation Authority, and representative of Airport Operators Council, urged corporation-owned aircraft to report complaints on service at airports to the airport managers, for remedial action. Aldrich said that service to non-air carrier planes, whether executive or personal, was handled at virtually all the larger airports by fixed base operators under contract. In only one case at a larger field (LaGuardia) is such service handled by the airport management directly. It is part of the manager's duties, Aldrich said, to see that the operators give proper service, and reports from the executive plane operators will help him in performing this job.

► **Industrial Users**—Progress of commercial aviation depends largely on the extent to which the American business man and farmer can use airplanes in increasing numbers, Joseph T. Geuting, Jr., manager of the Aircraft Industries Assn.'s personal aircraft council, told the meeting.

Geuting predicted that the rapidly increasing use of larger multi-engine executive transports by top industry personnel would logically be accompanied by increased use of smaller single-engine planes for sub-executives and sales staff.

Gordon Sleeper, New York aviation insurance man, outlined essential points in an insurance program for executive aircraft. A sample program for a twin Beechcraft owned by a large company, and valued at $83,000 included the following: hull insurance, all risks ground and air, no deductibles and no depreciation, $4200; liability including coverage for public liability and property damage, and admitted liability for passengers and crew $2466.31, a total annual premium of $6666.31.

► **Liability Varies**—Sleeper pointed out the program would vary depending on decisions of management whether legal liability only would be covered as to passengers, or whether an admitted liability program would be chosen, making it unnecessary for passengers to bring suit to collect for injury.

Walter Pague, Armco Steel Corp., Middletown, O., executive plane pilot, discussed safety operations, and Cole Morrow, executive pilot for J. I. Case Co., described proper flight operation procedure aimed at selling executive air travel to passengers. He prescribed "no sudden movements, changes of course, or changes of throttle setting," but gradual, smooth changes well planned to avoid abrupt and disconcerting actions that worry the passenger.

► **Passengers at Controls**—A poll of other pilots present indicated a majority favored the idea of letting passengers try out the controls under supervison in the co-pilot's seat to get a better idea of the airplane's operations and stability in flight.

C. B. Colby, executive secretary of CAOA, reported that there are nearly 100 executive planes now in the "CAOA fleet."

► **Odom Membership**—William B. Belden, Republic Steel Corp., Cleveland, chairman of the CAOA board, presented a certificate to Bill Odom, signifying his honorary membership in the association. The round-the-world flyer now operates Odom Aviation Corp., Teterboro, N. J.

Attendance included representatives of approximately 15 non-aviation firms using executive planes, in addition to approximately 50 representatives of various aviation interests.

Aeromatic Licenses British Firm

Licensing of the British firm of Hordern-Richmond, Ltd., to manufacture and sell Aeromatic propellers in British areas, Africa, Western Europe and Scandinavia, opens wider the non-dollar country market to the American-built propeller whose foreign sales heretofore have been relatively small due to monetary exchange difficulties.

Koppers Co., Inc., exclusive U. S. Aeromatic licensee, and Everel Propeller Corp., developer of the Aeromatic, will receive royalties payable in New York funds.

Sid Fedan, Koppers' Aeromatic department manager, said his technicians will work with Hordern-Richmond in setting up manufacturing facilities in England. The British plant has specialized in design and production of variable pitch propeller blades made of Hydulignum, a laminated densified wood material, used successfully on military aircraft with powerplants up to 3000 hp.

The British firm has agreed to establish service facilities, assume representation with Koppers' present overseas service stations, and conduct technical development work for fitting the Aeromatic to suitable European engines and aircraft.

AIR TRANSPORT

Lessons of the Mt. Carmel Crash

Industry and government work out safety measures that reduce danger from smoke or gas in cockpit.

New safety measures to reduce the hazard resulting from entrance of smoke or gas into transport plane cockpits have been adopted by airlines as a result of the United Air Lines DC-6 accident near Mt. Carmel, Pa., on June 17, 1948.

An official report issued by the Civil Aeronautics Board this month said the probable cause of the UAL mishap was incapacitation of the crew by a concentration of carbon dioxide gas in the cockpit. The gas seeped in after the crew discharged at least one bank of carbon dioxide fire extinguisher bottles in the forward cargo pit following a false fire warning.

▶ **Precautions Planned**—Ironically, at the time of the accident United was preparing a company bulletin specifying additional precautions DC-6 crews should take to guard against carbon dioxide concentrations.

Bound from Los Angeles to New York via Chicago, the DC-6 reported everything normal while flying over Pennsylvania a few minutes before the crash. Then UAL's radio operator at LaGuardia Field heard a voice calling loudly and urgently.

▶ **Garbled Transmission**—Crew of a United DC-3 flying behind the DC-6 heard "screaming voices" calling New York. After an unintelligible transmission, the DC-6 crew reported it was making an emergency descent.

Although there were visible areas where an emergency landing could have been made, the plane came down to less than 1000 ft., assumed an erratic course and crashed into a hillside. All 43 persons aboard were killed.

▶ **Valves Not Opened**—CAB said the physiological and toxic effects of high concentrations of carbon dioxide gas in the cockpit had probably rendered the DC-6 crew physically and mentally incapable of performing its duties. The Board noted, however, that the high concentration of gas probably would not have occurred if the crew had opened the cabin pressure release valves in accordance with CAA-approved procedure for operating the fire extinguishing system.

"It is not safe to assume that the pilot and copilot, under emergency pressure, will always adhere rigidly to the sequence of steps outlined in CAA's Approved Airplane Operating Manual," CAB continued. "Too little consideration has been given to the psychological and physical limitations of crew members in time of stress and danger."

The Board said design of aircraft controls, especially those used in emergencies, should take into consideration the limitations of human nature. To simplify emergency procedures, Douglas Aircraft Co. has designed and is testing a modified fire extinguishing system which will permit all necessary steps to be executed by the movement of one control. An additional vent also is being designed to reduce carbon dioxide concentration in the cockpit.

▶ **Masks Ordered Used**—Shortly after the Mt. Carmel accident, CAA directed all airlines to advise the flight crews of all aircraft to wear oxygen masks and utilize emergency cockpit smoke clearance procedures when carbon dioxide is released into any fuselage compartment with other than portable extinguishers. All scheduled U. S. carriers operating DC-6s have equipped the planes with demand-type full face oxygen masks for crew use.

The false fire warning on the UAL DC-6 was one of many turned in by detection devices during the first half of 1948. Scheduled airlines reported 22 false warnings of fire detectors in fuselage compartments and 285 false warnings by smoke detectors in the six-month period.

▶ **Detectors Disconnected**—As a result of these false warnings, CAA on Apr. 28, 1948, authorized airlines to disconnect smoke detector units where false alarms were shown to be caused by the units themselves, not by faulty installation or maintenance. On June 30, following the accident, CAA permitted the carriers to disconnect all smoke detectors.

Efforts are presently being made to improve the reliability of the warning devices sufficiently to permit their reinstallation in all airline transports (AVIATION WEEK, June 6).

Six months prior to the UAL accident, tests showed that sufficient carbon dioxide could accumulate in a DC-6 cockpit to cause partial incapacitation of the crew. As a result, facilities for greater ventilation were provided in the cockpit and cabin.

Even so, Douglas in its revised procedure for operation of the fire extinguishing system warned that failure to open the cabin relief valve (as the UAL crew apparently failed to do) might result in excessive amounts of carbon dioxide in cockpit and cabins.

▶ **ALPA Warning**—Only two months before the UAL accident, CAA received a letter from the Air Line Pilots Assn. citing the need for providing all cockpit personnel with smoke masks and mentioning the carbon dioxide hazard. CAA then instituted a medical study of the effect of smoke and noxious gases on flight crews, but the work was not completed until after the Mt. Carmel mishap.

Barely a month before the UAL

LETTERS FROM THE LOOP

Inauguration of helicopter airmail operations in the Chicago area this month permits 10-minute service between the airport and the downtown Post Office roof. A UAL DC-6 is shown ready to receive mail from a Helicopter Air Service, Inc., Bell 47-D1.

This industrial helicopter has seating capacity for pilot and two passengers, has useful load of 800 lbs. Driven by a 190 hp Lycoming engine, its range is about 235 miles, top speed 95 mph., cruising speed 70 mph.

"The newest thing in Helicopters"

Designers and engineers of the Kaman Helicopter chose SHELBY Tubing because they know they can depend on it. The finest tubing produced for aircraft applications, SHELBY Seamless is made to exacting Government specifications, is available in a complete range of sizes, and in the current alloy steels.

. . . attains maximum strength and lightness with SHELBY Aircraft Tubing

THE new Kaman Utility Helicopter, the K-190, which successfully passed its structural tests last year, is now in production for commercial uses.

This "definitely different" machine is unique in its use of dual, intermeshing rotors, and in the mounting of a pilot-controlled servo flap on the rotor blade which gives the craft pronounced stability and instantaneous control response.

Designed to be used as a piece of industrial and agricultural equipment, the K-190 features dependability of operation, sturdiness of construction, and easy accessibility for maintenance. These desirable properties are ensured largely by the use of SHELBY Seamless Aircraft Tubing throughout — in the rotor shafts, landing gear, fuselage and controls. All tubing is SAE X4130, chrome molybdenum steel. Approximately 110 individual SHELBY Tubes are welded to form the basic fuselage structure.

It is because SHELBY Seamless Tubing keeps weight to the very minimum and yet insures the utmost in ruggedness and shock-absorbing qualities that designers have for years used it in aircraft of every type and every size. With no other form of construction can you build so strong, so light, and so durable as with seamless steel tubing.

The uniformity and dimensional accuracy of SHELBY Seamless Tubing—its ability to bend and shape to almost any form desired — its easy welding properties that permit complicated joints and junctions with 100% efficiency, combine to help you achieve the utmost in structural efficiency. Our engineers will gladly assist you in applying U·S·S SHELBY Tubing to your designs.

WALLS WITHOUT WELDS

NATIONAL TUBE COMPANY, PITTSBURGH, PA.
(Tubing Specialties Division)
COLUMBIA STEEL COMPANY, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

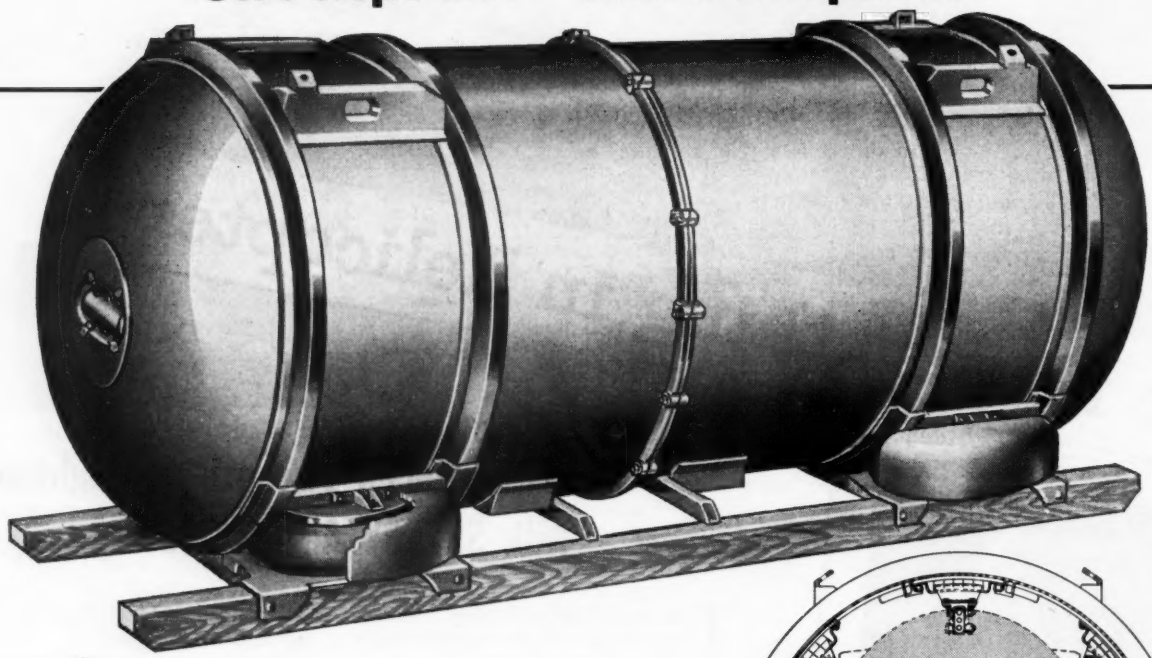
USS

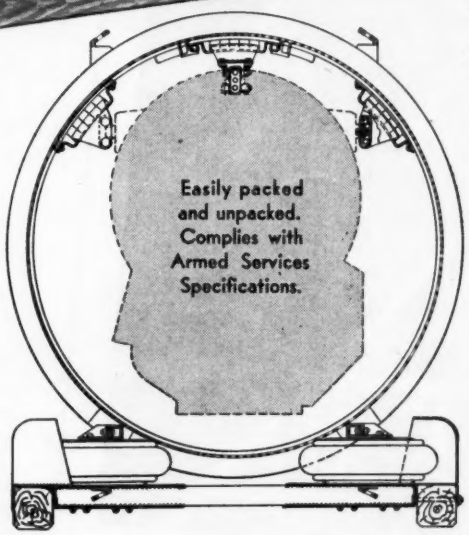
SHELBY *Seamless* AIRCRAFT TUBING

NOW! Firestone AIRPAK

FOR SHIPPING JET ENGINES

Shockproof—Moistureproof



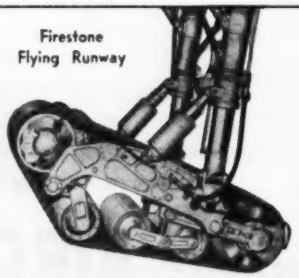


NOW you can ship jet engines anywhere—even overseas—without danger of breakage or corrosion. Firestone AIRPAK is a revolutionary new pressurized, moisture-proof steel container supported by four combination pneumatic-hydraulic shock absorbers. You get *double* protection against damage. The pneumatic action absorbs high frequency vibrations, protects delicate engine parts; the hydraulic action cushions severe shocks and jolts.

The AIRPAK is another in a long series of Firestone developments that has helped make aviation history. If you have any problem involving the use of rubber or rubber-to-metal, our engineers will be glad to work with you. Simply write The Firestone Tire & Rubber Company, Aviation Products Division, Akron 17, Ohio.

Copyright, 1949, The Firestone Tire & Rubber Co.

Bullet-Sealing Fuel and Oil Tank



Firestone
Flying Runway

Sky
Champion
Gear Grip
Landing
Wheel Tire

Sky
Champion
Leakproof
Tube

crash, a TWA Constellation crew had a false fire warning in a forward cargo compartment and released carbon dioxide in the area. Although partially incapacitated, the TWA crew made an emergency landing at Chillicothe, Mo.

►**ATA Act**—Following this incident, CAA made tests with the Constellation that pointed up the danger of oxygen deficiency in the cockpit when carbon dioxide bottles are pulled in the cargo compartment. As a result, the Air Transport Assn. on June 10—a week before the Mt. Carmel accident—warned all DC-6 operators by telegram that a similar situation might exist on the Douglases and advised making tests.

On June 14, Douglas wired ATA it had made carbon dioxide smoke evacuation tests on the DC-6 the previous February with results entirely satisfactory to CAA. Douglas told ATA: "Please contact all recipients of your June 10 wire and withdraw any reference to DC-6 aircraft, as tests you recommend are extremely hazardous to conduct. Recommendation regarding smoke evacuation for other aircraft does not necessarily apply to DC-6."

ATA advised its members of the Douglas telegram. Nevertheless, on June 15, United decided to instruct all its DC-6 crews to use oxygen masks when carbon dioxide was released. A company bulletin was being prepared when, two days later, the DC-6 crashed at Mt. Carmel.

SEATTLE-TACOMA DEDICATION

Evidence of the Pacific Northwest's airmindedness was the estimated crowd of 30,000 persons who turned out to the recent dedication of the $11 million Seattle-Tacoma Airport. On display before the $3 million administration building were both airline and military planes whose interiors were open for public inspection.

Alaska Fined

Alleged safety violations bring heavy penalties from CAA and CAB.

Severe penalties for infractions of federal safety regulations were imposed on Alaska Airlines this month by the Civil Aeronautics Board and Civil Aeronautics Administration.

Certificated within the territory of Alaska, and operating nonscheduled or contract to all parts of the world, the Anchorage-based carrier was cited for a series of offenses, most of which occurred during the past year.

►**Restrictions Imposed**—As a result, CAB suspended Alaska Airlines' nonscheduled operating certificate "until such time as CAA safety agents have made a complete examination of company equipment and operating methods to determine whether (Alaska) is able to conduct safe operations in accordance with the requirements of the Civil Aeronautics Act." The CAA Administrator was empowered to terminate this suspension upon completion of the examination.

CAB also limited Alaska Airlines to daylight VFR (visual flight rules) services under its scheduled operating certificate for seven days. Authority for resumption of complete scheduled service—including night flights—was to be given only after CAA made certain that the company was properly equipped.

►**$20,000 Fine**—CAA said it would "agree to consider accepting $20,000 as an offer of compromise from Alaska Airlines for offenses already committed against the Civil Aeronautics Act." CAA said upwards of $100,000 in penalties might have been sought.

Complaints filed by CAA against Alaska Airlines charged the company with:

- **Flying from the U. S.** and Alaska to foreign countries without an air carrier operating certificate authorizing such service.
- **Operating engines** in excess of the maximum allowable period between overhauls.
- **Failing to provide** an adequate number of check pilots to insure that each first pilot employed met route competency requirements.
- **Utilizing numerous pilots** in excess of the flight time limitation.
- **Using a pilot** who had flown over eight hours the previous day and had not had 24 hours rest.
- **Using a copilot** not qualified on the type of equipment operated.

Last November, the carrier allegedly listed falsely a captain named "McSneed" as making a flight, whereas no such pilot was employed by the company.

►**Accident Cited**—On Jan. 20, 1949, an Alaska Airlines DC-3 bound from Naknek to Anchorage crashed into a mountain near Homer, Alaska, killing five persons. CAA said the carrier had:

- **Used a captain** on the flight who had not been properly qualified over the route by a company check pilot.
- **Dispatched the plane** when weather reports used in the clearance were over 1 hr. 30 min. old at departure time.
- **Operated at night** from Homer to Anchorage under visual flight rules when instrument flight rules were required.
- **Operated the flight** at an altitude of less than 1000 ft. above the highest obstacle on the route in violation of regulations.

Previously, the company had a fatal accident at Seattle-Tacoma municipal airport on Nov. 30, 1947, when a DC-4 ran off the end of a runway, killing eight passengers, a crewman and the occupant of an automobile on an adjacent highway.

►**Other Penalties**—Alaska Airlines reportedly curtailed its world-wide charter and nonscheduled activities during the period just prior to the CAA-CAB disciplinary action. Coincident with the safety penalties, the company was fined $14,000 in Alaska district court (and President James A. Wooten was fined $1000) for violating an injunction against operating regular U. S.-Alaska flights. A further $25,000 fine was suspended contingent on future compliance with the injunction.

Alaska Airlines Board Chairman Raymond W. Marshall said his company did not admit the validity of charges against it but agreed to the fines to avoid litigation. He said many of the acts charged against Alaska would not have been considered violations if the nonscheduled flights in question had been regarded as "private carriage" as the company considered them to be.

New Pilot Union Challenges ALPA

National Pilots Assn., with 450 members, plans to group aviation employes into brotherhoods.

Details of a program to unseat the Air Line Pilots Assn. as exclusive collective bargaining agent for commercial pilots have been disclosed by the National Pilots Assn.

Chartered in November, 1948, NPA's membership at first consisted almost entirely of non-union pilots hired by National Airlines during ALPA's ten-month-long strike against the carrier. The new union, with headquarters in Miami, now claims about 450 members and hopes to organize a substantial number of the estimated 60,000 commercial pilots in the U.S.

In contrast to NPA's 450 members—some of whom fly for uncertificated carriers based in the Miami area—ALPA claims a membership of about 7600.

▶ **Organizing Plans**—Besides pilot personnel, NPA has its eye on flight engineers, stewardesses and ground employes. It hopes to affiliate with the Brotherhood of Locomotive Engineers, an independent union connected with neither the CIO nor AFL.

NPA would establish various "brotherhoods" among different categories of personnel in the air transport industry. The arrangement would be similar to that set up by the railroad engineers, firemen and trainmen.

Richard Hettenbaugh, NPA president, claims that ALPA's primary objective is to protect the interests of senior pilots on the certificated airlines. Copilots, he insists, are "forgotten men" under ALPA's setup.

▶ **Seniority System Hit**—NPA also accuses ALPA of establishing a seniority system of promotion which is dangerous to the traveling public. It says that under the pay formula in many ALPA contracts, senior pilots can only make more money if they fly bigger and faster aircraft.

Thus pilots not well qualified for flying the newer and larger transports are pushed into the jobs by ALPA's strict adherence to seniority promotion, NPA asserts. Hettenbaugh said his group proposes to protect the income of older pilots through a fogie system of pay increases similar to that in the armed services.

"We won't protect men who are operating equipment for which they are not fully qualified," Hettenbaugh told AVIATION WEEK. "We believe pilots should be required to prove their professional efficiency."

▶ **Ardmore Closing Cited**—NPA officials charged that David L. Behncke, ALPA president, forced the closing of American Airlines' Ardmore, Okla., training base. According to NPA, Ardmore's retraining program to weed out pilot misfits taken on during the war clashed sharply with ALPA's rigid seniority system. ALPA filed grievance cases when several of its members failed to pass Ardmore's "screening" tests.

The Civil Aeronautics Administration late last year drew up plans for taking over Ardmore as a central pilot training school to provide a uniform standard of transport pilot efficiency for both civil and military operations. ALPA vigorously opposed the central school idea. Finally, the Ardmore project was shelved.

▶ **National Airlines Election**—National Pilots Assn. hopes to secure a firm foothold in the airline industry by winning a National Airlines bargaining election. The new union claims it now represents over half of NAL's cockpit personnel.

Hearings to determine which pilots are eligible to vote if an election is held are to be conducted by the National Mediation Board late this month. ALPA claims that National Airlines has kept NPA personnel on its payroll unnecessarily and that these superfluous pilots should not participate in the election.

Skycoach Fails For Mid-Continent

Mid-Continent Airlines, one of the five certificated domestic carriers conducting scheduled air coach service, has asked Civil Aeronautics Board permission to cancel the cut-rate tariff because four-cents-a-mile operations have not proved sufficiently profitable.

MCA began its DC-3 coach flights between Kansas City and Minneapolis-St. Paul on Mar. 1. During April and May the carrier was able to show a load factor of only 53.8 percent on its coach flights, compared with 59.2 percent on its regular-fare schedules.

▶ **Survey Cited**—A recent CAB survey (AVIATION WEEK, Aug. 1) showed that Mid-Continent derived only $28,996, or 2.8 percent of its revenues, from coach service during April and May. MCA planned to quit coach operations late last week if the Board approved.

Mid-Continent's action focused attention on the future of Continental Air Lines' four-cents-a-mile flights between Kansas City and Denver. Although CAL has been operating this service since Feb. 17, it had a load factor of only 39.8 percent during April and May compared with a 40.3 percent load factor on regular flights.

▶ **Further Cut Refused**—Continental took in only $22,326 from air coach in April and May—considerably less than Mid-Continent. CAL has tried to reduce its Kansas City-Denver DC-3 coach rate to 3.3 cents a mile but CAB rejected the tariff.

Fight Ends

Port Authority and five airlines make deal that may set precedent.

After two years of harsh dispute, the Port of New York Authority and five major airlines have reached an agreement concerning Idlewild Airport leases which may set the pattern for other airport-airline negotiations throughout the country.

Differences were settled after airline representatives of American, American Overseas, Northwest, Pan American and British Overseas Airways Corp., along with Port Authority officials, met for 23 hours with New York's governor Thomas E. Dewey.

Under the agreement, airlines will pay a flight fee of 12 cents per thousand pounds of maximum gross aircraft weight. Computed with the Port Authority's estimate for annual yearly takeoff weight of 5,748,750,000 lb. at Idlewild, flight fees will bring more than half a million dollars per year.

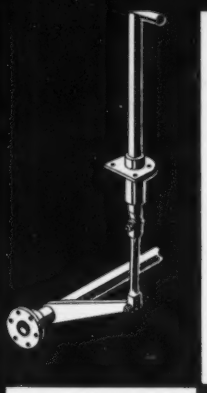
▶ **No Sliding Scale**—The airlines abandoned their fight for a sliding scale of flight fees. Under the agreement, rates will not decrease with large numbers of flights by the same airline each day. Unit figure for computing flight fees is much more than the rate originally asked by the Port Authority but an Authority representative told AVIATION WEEK the original figure of 10.76 cents per thousand pounds was established in 1948 and the new figure reflects additional costs.

Both factions agreed that the Port Authority will provide facilities for unloading and storing gasoline at a flat fee of 5½ mills per gallon. The Authority may directly or by contract provide facilities to handle distribution of the gasoline from storage tanks to aircraft at rate per gallon to the airlines "which shall be reasonable."

▶ **Victory in Defeat**—On the surface the settlement was a clear-cut victory for the Port Authority. But while yielding on the financial aspects, the airlines may have achieved a far-reaching victory on another issue: the Authority's inviolability to suit.

The compromise includes the Au-

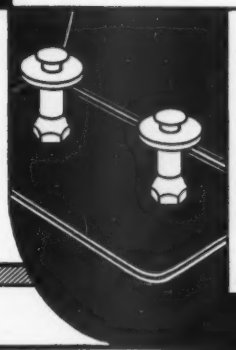
S-700

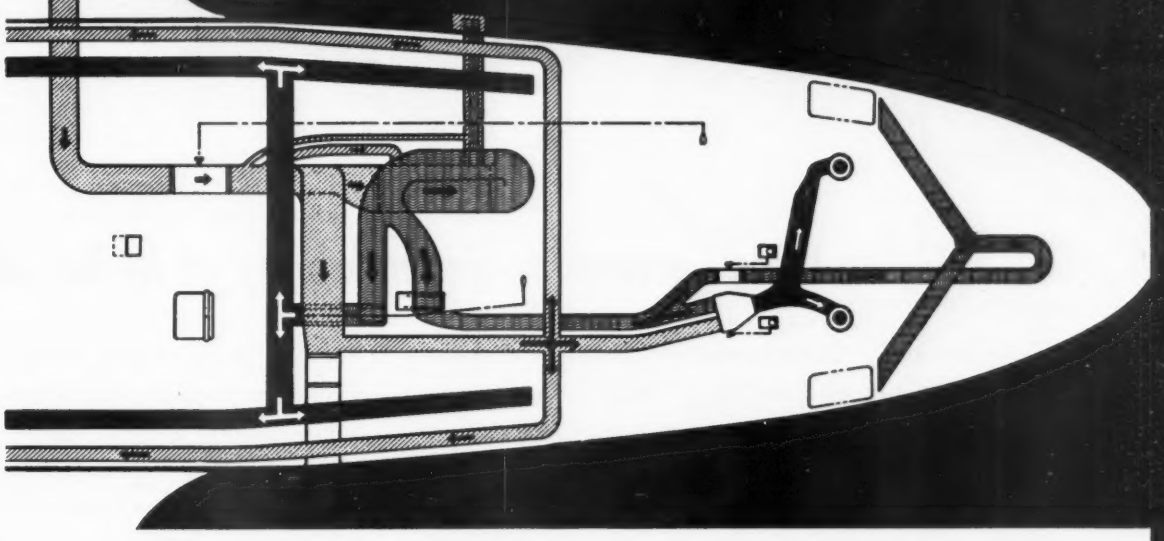


1 for the cabin

S-200

2 for the crew.





S-100

S-50

S-25

V-15

COLD AIR

MIXED AIR

HOT AIR

One Janitrol heater serves new Douglas Super DC-3

Three manual controls are the keys to comfort, reliability, and functional simplicity in the Janitrol-equipped air conditioning system of the new Super DC-3. A modern heating system for a modernized version of a "tried and true" transport plane.

One lever controls hot and cold air mixture for the cabin; one knob controls flight compartment warmth; second knob controls hot air for windshield de-icing. Warm air ducts running fore-and-aft along cabin walls give off radiant heat as well as distribute warm air. Blower is provided for ground operation of heater.

The new Janitrol-developed radiant tube-within-a-tube doubles heating capacity in half the space, and low ventilating air pressure drop cuts ductwork sizes, saves pounds and inches all along the line . . . Call on the fund of experience and information your Janitrol representative can provide—on military or commercial aircraft—early in the preliminary design stage. A letter or phone call will do it.

Janitrol

AIRCRAFT AND AUTOMOTIVE HEATERS *with the whirling flame*

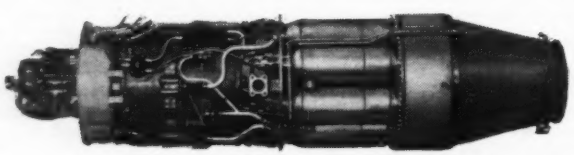
AIRCRAFT-AUTOMOTIVE DIVISION • SURFACE COMBUSTION CORP., TOLEDO 1, OHIO

NEW YORK, N. Y., 225 BROADWAY; KANSAS CITY, MO., 950 DIERKS BUILDING; LOS ANGELES, CALIF., 714 OLYMPIC BLVD.

"Flying Wing" attests to dependability of Nickel Alloy Steels

Ever since the Wright brothers' epochal flight, man has sought a plane with minimum "drag". . . *to secure maximum lift, speed and payload capacity.*

An approach to this goal is the "Flying Wing"*, designed and produced for the Air Force by Northrop Aircraft, Inc., at Hawthorne, California. A decade of Northrop experimentation and research indicates that this type of aircraft attains about 25% greater flying efficiency than planes of conventional design.



Nickel Alloys are specified for combustion chambers, flame tubes, casings, and diaphragms in the J35 turbo-jet engine. Turbine shafts and hubs are forged from Type 4340 (Ni-Cr-Mo) steel.

Not only in the "Flying Wing", but also in the "J35" aircraft turbo-jet engines that power the 100-ton YB-49 bomber, shown above . . . nickel alloy steels play a vital role . . . resisting heavy stresses, intense heat, fatigue, corrosion and other service conditions. In fact, each YB-49 utilizes hundreds of pounds of chromium-nickel stainless steels for fire walls, exhaust system, hydraulic equipment, bomb bay doors and similar applications.

Engineering steels and stainless steels containing nickel are engineered to meet exacting requirements for aircraft and allied industries. We solicit the opportunity to help you with counsel and data.

*Trade Mark Reg. U. S. Pat. Off

EMBLEM OF INCO SERVICE
TRADE MARK

Over the years, International Nickel has accumulated a fund of useful information on the properties, treatment, fabrication and performance of engineering alloy steels, stainless steels, cast irons, brasses, bronzes, nickel silver, cupro-nickel and other alloys containing nickel. This information is yours for the asking. Write for "List A" of available publications.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

thority's promise to join in pushing legislation to end its immunity to suit. As the Port of New York Authority has been the pattern for virtually every other public authority in the country, this feature of the compromise may precipitate a nationwide reform.

This is touched on by American's president C. R. Smith in an exclusive statement to AVIATION WEEK:

"The lack of agreement between the Port Authority and the air lines has unmistakably demonstrated that no real and lasting basis for mutual effort will be found until both parties are accountable for their acts and their undertakings can be enforced in the same courts which have jurisdiction over comparable agreements by other parties.

"A solution to the problem has been long delayed by the insistence of the Port Authority that it cannot be subjected to suit to enforce its undertakings. This, in the new agreement, has been overcome by an obligation to support legislation which will make that possible and usual."

Also provided in the compromise:

• **Fees may be raised** each year in accordance with maintenance and operating costs of the airport.

• **Provision will be made** for arbitration of any future disputes arising over the leases.

The five airlines agreed to encourage other airlines to execute leases similar to those outlined at the meeting with Governor Dewey. Basic terms of the leases:

• **Port Authority will construct** hangars with 10 percent of total cost to be paid in advance by the airlines. Airlines will pay 105 percent of the total cost in addition to an annual ground rent of $1300 per acre. (In March, construction began on three hangars.)

• **Airlines may build** their own hangars by paying the same ground rent, but ownership is to be vested in the Authority after construction.

• **Airlines will pay** $6 per sq. ft. in the temporary terminal facilities for counter space; $4 per sq. ft. for other first floor space; $3 per sq. ft. for second floor space and $2.50 for cargo space. (This week Port Authority commissioners will consider a $1.1 million measure for an expansion to the terminal building.)

July Traffic Falls But Profits Steady

Domestic air lines mixed a little of the bitter with the sweet in financial and traffic reports issued early this month.

More glowing profit statements from first-half 1949 business were announced. Coincidentally, preliminary estimates showed that passenger loads during July fell off markedly from record June levels.

► **Accidents Hurt**—The Air Transport Assn. about the middle of July estimated that revenue passenger miles flown by the 16 domestic trunklines during the month would be 5 percent below June. But traffic slipped noticeably after fatal crashes involving a nonscheduled Standard Airlines C-46 in California and a KLM Constellation in India on July 12; a nonscheduled Air Transport Associates C-46 in Seattle, July 19; and an Eastern Air Lines DC-3 near Fort Dix, N. J., July 30.

As a result, July's domestic revenue passenger mileage is now estimated at 8 percent below June's—although well above July, 1948. Last year, the June-July decline was only 5 percent. Despite the slackening in passenger business, the certificated domestic carriers as a whole were expected to be well in the black for last month.

► **New Reports**—Meanwhile, new financial reports for first-half 1949 showed generally excellent earnings:

• **American Airlines** announced a $3,536,000 net profit after taxes compared with a $4,098,000 net loss for the first six months of 1948. Total revenues of $49,752,000 represented a 29 percent gain over last year, with gross passenger income up $9,456,000, mail up $911,000 and cargo up $828,000.

Operating expenses rose about 8 percent over first-half 1948. Of the $3.5 million increase in costs, flying operations (consisting primarily of crew salary, fuel and oil) accounted for $2.1 million.

Although July traffic was about 10 percent below June, AA expects business will improve during the late summer and early fall.

• **Chicago & Southern Air Lines** earned $296,621 net profits in first-half 1949 against $267,682 in the same period last year. About $202,000 of this year's profit was on domestic operations and $94,000 on international services.

Domestic passenger revenues rose 8.1 percent, while mail pay declined 9.4 percent from 1948 levels. Domestic seat-mile costs for the first six months of this year were 3.97 cents—down 7.5 percent from the 4.29 cents in first-half 1948.

• **Northeast Airlines** reported a $76,283 net profit for second quarter 1949, reducing its first-half deficit to $119,305. Company made money in April, May and June, whereas in past years earnings have generally not started until the summer months.

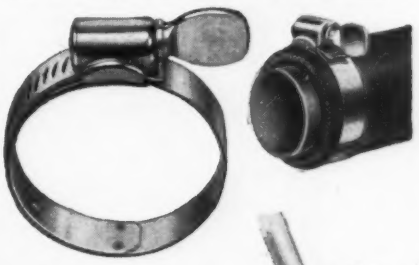
• **Northwest Airlines** estimated its July revenue at $3,885,000. July profit determination has not yet been made, but probably will be lower than June's record of $1,022,000. Carrier's net profit for the year at the end of June was $430,915, compared to a net loss of $2,016,298 for the first six months of 1948. July, 1948 revenues were $3,272,404.

The Standard of the Industry

WITTEK
STAINLESS STEEL
Aviation
HOSE CLAMPS

TYPE FBSS

Utilizing the basic Wittek Floating Bridge . . . this type has been tested and proven through over ten years of dependable service on all types of aircraft applications.



TYPE WWD

Pioneered in stainless steel construction by Wittek for greater strength and dependability . . . this type is available in all standard aircraft sizes, also in large diameters from 4" to 12" for ducts and special applications.

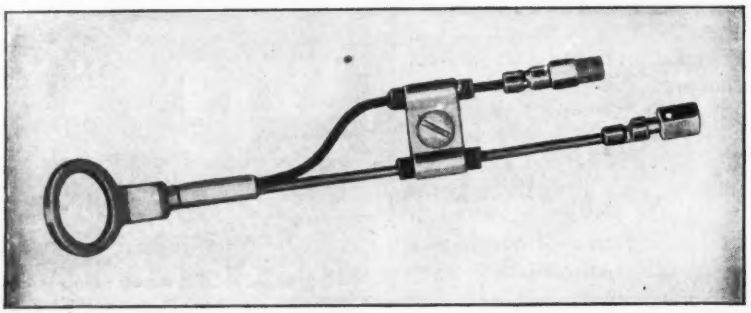
Wittek Aviation Hose Clamps meet current AN specifications and have C.A.A. approval.

WITTEK
MANUFACTURING CO.
4308 W. 24th Place
Chicago 23, Ill.

Aviation HOSE CLAMPS

Dependability In Hose Clamps For Over A Quarter Of A Century

THERMOCOUPLES
For ALL Aircraft and Engine Uses

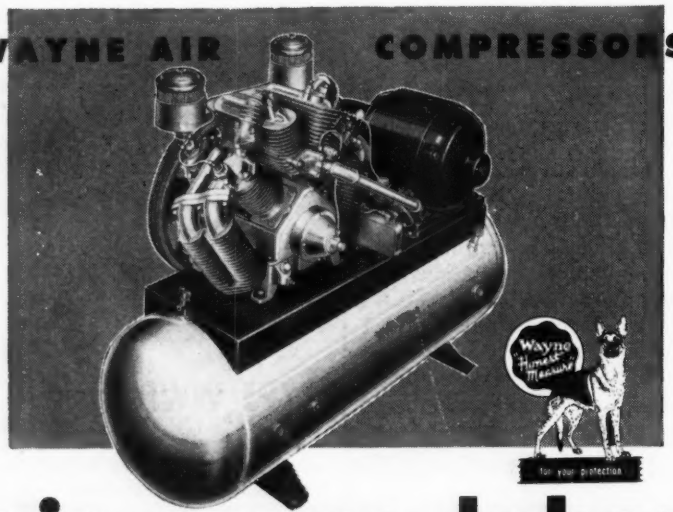


Our Standard and "AN" Type Thermocouples for checking temperatures of Cylinder Heads, Cylinder Bases, Bearings, Oils and Coolants, Air and Mixtures and Exhaust Gases, are made in many different types—Gasket . . . Bayonet Immersion . . . Blind Rivet . . . Protected . . . Exposed Loop . . . Single and Multiple Shields. These Thermocouples are available for all types of pyrometers in Iron Constantan, Chromel Alumel and Copper Constantan.

We can also furnish Quick Coupling Connectors, Connector Panels and Extension Lead Wires.

Write for Bulletin 14, Reference C, giving a complete description of our Aircraft Thermocouple Equipment.

Thermo ELECTRIC CO.
FAIR LAWN, N.J.



air saves labor

THERE ARE many tasks about the busy airport which can be accomplished quicker, better, and cheaper with compressed air. Here's a big, rugged unit that will care for all your needs. Mail the coupon now for catalog.

BACKED BY WAYNE NATIONWIDE SERVICE

Send for Catalog

THE WAYNE PUMP COMPANY
525 TECUMSEH STREET FORT WAYNE 4, INDIANA
☐ Please send us the Wayne Air Compressor Catalog.
☐ Send Salesman.
NAME ADDRESS
CITY STATE

COLLAPS-A-HOSE SYSTEMS • CABINET TYPE REFUELLERS

Cockpit Visit Poll

An Air Transport Assn. poll has shown that 16 of ATA's airline members are in favor of asking the Civil Aeronautics Board to permit passengers to visit aircraft cockpits during time of flight.

Four carriers opposed changing existing regulations so that the captain, at his discretion, can take a passenger forward to see the cockpit. Another four airlines were unable to see the wisdom in such a rule change.

SHORTLINES

▶ **American Overseas**—Will inaugurate a luxury "sleeper lounge" Constellation service to Scandinavia starting Nov. 15. Flights will carry maximum of 23 passengers but there will be no extra charge. The Connies will replace DC-4s which AOA has used on the Scandinavian run since 1946.

▶ **BOAC**—Revenue passenger mileage flown between April, 1948, and March, 1949, increased 22.2 percent over the previous 12 months. British European Airways reported a 26.6 percent gain and British South American Airways a 5.6 percent loss during the same period.

▶ **CAB**—Will permit initial decisions by its examiners in uncontested domestic economic proceedings of limited importance after Sept. 2. Heretofore, the Board itself has made all initial decisions. . . . Raymond W. Stough, director of CAB's Alaskan office, has retired.

▶ **Central Airlines**—First routes to receive lightplane feeder service when the company starts operations around Aug. 31 will be Forth Worth/Dallas to Oklahoma City and Wichita, Kans. Carrier will make two roundtrips daily.

▶ **Coastal Air Lines**—The New York nonscheduled operator has received CAB authorization to make five DC-4 roundtrips between New York and Lydda, Israel, prior to Sept. 30 for the American Friends of Kfar B'nai Zion, a nonprofit Zionist organization.

▶ **Empire**—Reports record traffic during second quarter 1949, when it flew 9289 passengers and had a 35.14 percent passenger load factor. During the first half of this year the feeder carried 16,054 passengers against 9182 in the same 1948 period. June load factor of 38.13 percent was the highest in Empire's experience.

▶ **Mid-Continent**—Nine fixed-base operators in off-route Iowa communities have been named general agents for MCA during a six-months trial period.

▶ **Midwest Airlines**—The Des Moines-

based feeder (formerly Iowa Airplane Co.) plans to inaugurate scheduled feeder service with single-engine Cessna 190s about Sept. 1.

▶ **National**—Herbert C. Dobbs has resigned as vice president-traffic and director. He joined NAL in January, 1946, after being with Pan American Airways 17 years.

▶ **Northwest**—Made its first scheduled domestic Stratocruiser flight on Aug. 1, when the plane was put on the Chicago-Twin Cities run.

▶ **Pan American**—On Aug. 1 cut cargo rates up to 50 percent between the U. S. and Latin America. Chicago & Southern Air Lines' request that CAB reject the new tariff was denied.

▶ **Pioneer**—Celebrated its fourth anniversary of service on Aug. 1. During the past four years the feeder has flown 235,000 passengers without a fatality. Company now has 460 employes and eleven DC-3s.

▶ **Resort Airlines**—Reports a net profit of $45,480 on total operating income of $138,053 in first-half 1949. Company forecasts an extensive expansion as a result of its certification in June for all-expense vacation routes from the U. S. to Canada, the Caribbean, Central and South America. . . . RAL is now making daily "race track special" intrastate DC-3 flights from New York City to Saratoga, N. Y.

▶ **TWA**—Is dressing up the interiors of 10 DC-4s used in international operations. Company found that its Constellations had completely overshadowed the DC-4s in passenger preference, with would-be Connie riders sometimes unable to obtain space while Skymasters flew with light loads.

CAB SCHEDULE

Aug. 15—Hearing on Hughes Tool Co. control of TWA. (Docket 2796)

Aug. 16—Prehearing conference on service to Lumberton, N. C. (Dockets 3289 and 3299)

Aug. 22—Hearing on extension of Expreso Aereo Interamericano's Havana-Miami Foreign air carrier permit. (Docket 3717)

Aug. 29—Hearing on Trans-Canada Air Lines' application for foreign air carrier permit to operate from Montreal to New York. Postponed from Aug. 15. (Docket 3964)

Sept. 6—Hearing on service to Lake Tahoe. (Docket 3623).

Sept. 12—Hearing on CAB investigation of International Air Transport Assn. Agency resolutions. (Docket 3350)

Sept. 19—Hearing in air freight tariff agreement case. (Docket 2718 et al)

Sept. 19—Hearing on American Airlines service to Springfield, Mass., through Bradley Field. (Docket 3748)

Sept. 26—Hearing on Seaboard & Western and Transocean Air Lines applications for all-cargo certificates between the U. S., Europe and the Middle East. (Dockets 3041 and 3818)

Sept. 26—Hearing on disposal of Parks Air Lines' routes. (Docket 3965 et al)

Nov. 14—Hearing in Western-Inland mail rate case. (Docket 2870)

SEARCHLIGHT SECTION

(Classified Advertising)

EMPLOYMENT : "OPPORTUNITIES" : EQUIPMENT
BUSINESS : : (Used or Resale)

UNDISPLAYED —RATES— DISPLAYED

(Not available for equipment advertising)

90¢ a line, minimum 4 lines. To figure advance payment count 5 average words as a line.

Individual Employment Wanted advertising rate is ½ the above rates payable in advance.

Box Numbers—Care of publication New York, Chicago or San Francisco offices count as one line.

Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Individual Spaces with border rules for prominent display of advertisements.

The advertising rate is $10.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

An advertising inch is measured ⅞" vertically on one column, 3 columns—30 inches—to a page.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

BUSINESS OPPORTUNITY

AVAILABLE IN Florida.
Long term exclusive lease and complete aviation business (Sales-Service-Training) on ideally located airport. Favorite winter resort for fair tourists. Selling because of other interests. Part of investment can be financed. BO-9220, Aviation Week.

WANTED

Wanted: AT-6 or SNJ
aircraft suitable for dual instruction. Send details Aircraft Sales, Ltd., 5478 Wilshire, Los Angeles.

Wanted: Grumman Widgeon
G 44-A long nosed model. Send details, Aircraft Sales, Ltd., 5478 Wilshire Blvd., Los Angeles, Calif.

WANTED

DC4 — AIRCRAFT WANTED — C46
Have Capacity Overseas Flights, Passenger & Cargo. Need—DC4's or C46's. Willing Negotiate On Profit Sharing Basis.
International Veterans Airlines, Inc.
62 William Street, New York, N. Y.

DESIGN ENGINEER
Experienced to design and make accurate layout of Aircraft Electric Motorized Equipment with minimum assistance from chief engineer.
Aggressive moderate size owner managed company offers excellent opportunity for good man.
Send full details with reply.
P-9552, Aviation Week
330 W. 42nd Street, New York 18, N. Y.

SCHOOL

Rising Sun SCHOOL OF AERONAUTICS
ESTABLISHED 19[illegible]
Built Upon the Success of its Graduates
GOVT. C.A.A. and VETERANS APPR.
ENROLL NOW FOR NEXT CLASS
Write for Illustrated Catalog
2206-16 E. HUNTINGDON ST. PHILA.

C.A.A.-APPROVED OVERHAULS
Engines N.T.S.O. P & W N.T.S.O. Engines
For Sale

Without Exchange—Exchange Price		Basic Overhaul Prices	
R1830-92	$2,500-$2,290 exchange	R1830's	$1,200.00
R1340-AN-1	2,250- 1,750 exchange	R1340's	700.00
R985-AN-1 or 3	1,650- 1,450 exchange	R985's	600.00
R985-14B	2,050- 1,850 exchange	R2800 B's	1,400.00
R2800-51 or 75	2,100- 1,950 exchange		
R-1830-65-92	1,850 Conv. Less Carb.		

The above prices are all Plus Parts

DON'T TAKE CHANCES ON SURPLUS ENGINES
All work and engine sales carry our 100 hr. warranty
Discounts on Quantity Purchases of Five or More Engines
The management and Key Men of A. C. E. S. are all former Pratt & Whitney Aircraft Supervisors and have the benefit of over 75 years accumulated experience. We have complete facilities for overhaul, Block Test, Installation and handle all accessories pertaining to the engines. We have been engaged in the Overhaul & Sale of engines here for the past four years.
CAA Approved Sta. #3604
AIR CARRIER ENGINE SERVICE, INC.
P. O. Box 1388 Miami, Florida
Buildings #251 & 252 International Airport Cable "ACENGSER"

SPECIAL . . . . .

for the private owner

REPUBLIC AT-12

High speed—2 place
Cruises at 273 m.p.h.
2,000 miles range. Completely overhauled and NX licensed.

PRICE $10,500.00

Fighter performance with excellent handling characteristics.

THE BABB COMPANY, INC.
1007 Airway, Glendale, California

New York Washington, D. C. Montreal
Amsterdam Geneva Honolulu

BONANZA

Model 35. Serial No. D-1287. Purchased new February 1948. 550 hours on aircraft and engine. 500 hour check and Beech factory representative check just completed. Always hangared. Flown by one pilot only for company transportation.
Extra Equipment: Directional gyro and horizon with suction gauge, remote indicating compass, accelerometer, NARCO VHF transmitter and tunable receiver. Up-to date Jeppesen manuals included with revisions service to March 1950.

PRICE: $6500

Heiland Exploration
630 Giddens-Lane Building
Shreveport 4, Louisiana

FOR SALE

BEECHCRAFT

D-18-S

Total time 1770 hrs.
420 hrs. since major overhaul on motors
Propellers full feathering
Complete VHF & ADF Radio
New Deicer Boots Tires & Carpeting
Ship just relicensed
Perfect Condition
2 Extra O-time overhauled motors included.

PRICE $38000.

STANDARD OIL CO. (OHIO)
Midland Bldg. Cleveland 15, O.
Phone MA. 7400 Ext. 358

COMPLETE DC-3 & DC-4 PROVISIONING PROGRAMS

Douglas Airframe Components
Pratt & Whitney and Wright Engines, Parts and Accessories
Hoses and Ducts

Distributor, United States Rubber Company Aviation Products

MANUFACTURER OF STANDARD AIRCRAFT COMPONENTS

Industrial Associates, Inc.

Suite 220, 8845 W. Olympic Blvd. Beverly Hills, Calif.
Cable address, INDASSO (Santa Monica block)
A Leading West Coast Exporter of Aviation Supplies

ACCESSORY OVERHAUL INDUSTRIES, Inc.

announce their appointment as an

• AUTHORIZED STROMBERG SERVICE STATION •

for the

BENDIX PRODUCTS DIVISION

in the overhaul and test of

STROMBERG DIRECT INJECTION PUMPS,
MASTER CONTROLS AND INJECTION CARBURETORS.

•Work is accomplished by factory and airline trained mechanics and accompanied by CAA #337 forms.

Replacement parts are purchased direct from manufacturers.

Work is charged on a flat rate price plus replacement parts.

Address: 130-41 91 Ave., RICHMOND HILL 18, NEW YORK

•This authorization of our facilities is the first to our knowledge that has been issued in the field. It is another indication of the regard for a quality product in the service field, which we have successfully offered since our inception.

YOU ARE ONE

of the 33,000 readers of AVIATION WEEK.

Your problems in the field of Aviation Design, production and maintenance— business or individual—are duplicated with *other* readers BUT—

Still *OTHER* readers can provide the solution of your problem if they *know what it is!*

Tell them! Here! Through classified advertising in the Searchlight Section of AVIATION WEEK —*your* business paper and *theirs.*

new and used DC-3 and DC-4 parts, equipment and accessories at below cost!

For DC-3, DC-4 and P. & W. R-1830 and P. & W. R-2000 parts, accessories and components, contact:

Surplus Sales Representative,
Stores Dept.
United Air Lines Maintenance Base,
Bayshore Highway,
South San Francisco, Calif.
Telephone JUno 8-2424

Items are available for your inspection at the above address. Prompt delivery. Guaranteed to be as represented.

UNITED AIR LINES

FOR SALE!

DC-4 (C-54-B-DC) 50-PASSENGER AIRPLANES

$125,000.00 and up

plus 2% sales tax

- Equipped with P. & W. R-2000-13 (2SD13G) Engines.
- Recently removed from scheduled passenger service.
- Standard airline interior.

"AS IS" MUNICIPAL AIRPORT, TULSA, OKLAHOMA

Address all inquiries to:

AMERICAN AIRLINES, INC.
Att: Director of Surplus Sales
43-02 Ditmars Boulevard, Astoria, Long Island, N. Y.
(Telephone RAvenswood 8-1000)

AIRCRAFT & ELECTRONIC EQUIPMENT

As a leading supplier we offer a complete line of

BRAND NEW INSTRUMENTS

- FLIGHT & NAVIGATION INSTRUMENTS
- ENGINE INSTRUMENTS
- AUTOMATIC PILOTS
- INVERTERS
- AUTOSYNS
- PRECISION AUTOSYNS
- RATE GENERATORS
- SINE-COSINE GENERATORS
- SYNCHROS
- ALNICO FIELD MOTORS
- GYROS
- A.C. MOTORS
- D.C. MOTORS
- SERVO MOTORS
- TORQUE UNITS
- TORQUE AMPLIFIERS
- FREQUENCY METERS
- BLOWER ASSEMBLIES

Write for complete listings

All Instruments May Be Purchased
C.A.A. Certified
U. S. Export License-2140

WUX Flushing, N. Y.

INSTRUMENT ASSOCIATES

147-57 41st AVENUE, FLUSHING, N. Y.
Tele: INdependence 3-1919

If there is anything you want

or something you don't want that readers can supply—or use—advertise it in the

Searchlight Section

DOUGLAS - DC-3 TYPE— LOCKHEED-LODESTAR—

Cargo- Passenger- Executive

Choice of: Interiors—Radio—Instruments

Optional: Engine and Propeller Combinations

Large Stock of: Engines—Propellers—Accessories

$200,000 Inventory of Lockheed Airframe Parts

LBS AIRCRAFT CORP.

Affiliate of Aerodex, Inc.

Hangar #2
International Airport
Miami, Fla.

P.O. Box 1255
Miami Springs, Fla.
Phone 88-5257

"Specializing In Finest Quality Transport Aircraft"

DOUGLAS PARTS and COMPONENTS

$1,000,000 Inventory of DC-3 Material

Including

Wings—Center Sections—Control Surfaces—Fuel Tanks

Landing Gears—Hydraulic Units—Tires

MAINTENANCE - OVERHAUL - CONVERSION - STORAGE

AERODEX, INC.

Affiliate of LBS Aircraft Corp.

Hangar #2-4
International Airport
Miami, Fla.

P. O. Box 1255
Miami Springs, Fla.
Phone: 88-5257

CAA Approved Repair Sta. 3612

STRICTLY PERSONAL

LET'S MULE THIS ONE OVER—The other day **Charlie Planck** of CAA's information office was running through cards returned to CAA for its survey on aircraft use in 1947, and got this extra bang. In tracing NC 52401, **H. P. Gassaway,** CAA aircraft agent, had discovered that this ship had been sold by a flying service to a Murfreesboro, Tenn., man, who in turn traded it for a Crosley car. The car dealer traded it to somebody else for a mule. Charlie keeps wondering which was in better shape, the plane or the mule.

* * *

THE TIE-DOWN THAT COULDN'T BE—Airline ground equipment personnel meeting in Miami recently to thresh out their problems couldn't understand why the attrition rate of one particular type of tie-down equipment was so nearly 100 percent that they were having to abandon it for another device. **Charles Adams,** our Transport Editor, says they finally discovered that the item was beautifully adaptable for use as hammocks in the homes of the light-fingered.

* * *

A MENACE TO NAVIGATION—**Al Wolf,** the well known AOPA and Philadelphia insurance mogul, scribbles a memo to tell us about the captain who had to discharge his navigator because he couldn't tell his azimuth from a hole in the ground.

* * *

THE PAUSE THAT REFRESHES—**A Mr. Edgar S. Bayol,** who must just read newspapers and magazines all day looking for items about his favorite soft drink, attaches a clipping from AVIATION WEEK for last December to the letterhead of the Coca Cola Co., and says they appreciate the unsolicited publicity but ask if we realize that the entire Coca Cola Co. and its future is in jeopardy because we didn't use a capital "C" in the word "coke." It has something to do with the Lanham Trade-Mark Act. It's things like this that make us warn all journalism students against becoming editors. Having responsibility for the future of Coca Cola on our shoulders is something we never expected when we joined McGraw-Hill in 1943 to start AVIATION NEWS.

* * *

THIS PLANE STINKS—**Bill Strohmeier,** who now handles publicity and advertising for aviation people (advt.) writes from his New York office at 475 Fifth Ave., that our item on UAL squawk sheets July 11 reminds him of wartime pilot instruction at **Bevo Howard's** Hawthorne Field.

"Taking off at sun-up with his first student, an instructor immediately noticed a very foul odor. He landed the ship, wrote out Form 1, saying, 'This plane stinks.' Dispatcher gave him another Stearman. Same thing happened. Dispatcher turned over Plane No. 3. Same story. Finally, a native heard what was going on and solved the mystery. The very pungent odor was smoke from paper mills at Charleston, S. C., 75 miles away, very noticeable under certain wind and heavy-air conditions.

* * *

ARE YOU LOST? FIND YOURSELF HERE!—**Louise Thaden** suggests we start a lost and found department so we can ask what has become of **Mac** and **Jim Haislip?** Does anyone know?

* * *

WAS IT A MOTORIZED BELL BARROW?—Correspondent **Bert Reichert** of Beaver Dam, Wis., hurries off a bulletin that a certain farm resident near Green Bay is letting his cows wander around the local airport just because of sheer spite. That field has caused him deep trouble. It seems that not many weeks ago this citizen complained to authorities that his wife had left him, taking her baggage in his wheelbarrow. Well, the constables found the wifeless, empty wheelbarrow at the airport. So, the lone ranger says if those fly people want his cows off the field they better build a fence.

* * *

WELL, A LADY CAN'T BE TOO CAREFUL—**Robert D. Havenstein,** New York sales manager for U. S. Airlines, writes this really happened:

"A female shipper called the U. S. office the other day and asked what time the midnight cargo plane left for Atlanta. The answer we gave her was 'Midnight, Madame'."

R.H.W.

WHAT'S NEW

New Books

"Constructive Uses of Atomic Energy," edited by S. C. Rothman, contains 14 articles by atomic research scientists on the use of the atom in such fields as aviation, industrial power, chemistry, and ceramics. Published by Harper and Brothers, 49 E. 33 St., New York 16, N. Y. Price $3.

"Australian Aviation Annual, 1949," edited by Stanley Brogden, replacing the Australian Aviation Yearbook. It covers civil and military aviation, manufacturing, gliding and model building.

Trade Literature

"Precision Parts," a 20-page catalog of valves and controls, available on request to Kohler Co., Kohler, Wis.

"Service Bulletin," a supplement to the BG service and maintenance manual, containing inspection standards for the BG platinum alloy fine wire type spark plug electrodes, available on request to BG Corp., 136 W. 52 St., New York 19, N. Y.

"Ajusto-Spede," a 12-page bulletin describing an alternating current motor, available on request to Louis Allis Co., 427 E. Stewart St., Milwaukee 7, Wis.

"Project Squid," a four-page folder describing equipment and procedures developed and used in basic studies of pulse-jet engines by the Research division of New York University. Available on request to V. W. Palen, Bureau of Public Information, New York University College of Engineering, New York 53, N. Y. Enclose 10 cents to cover handling and mailing cost.

"Taco Catalog No. 30," containing information on performance of antennas, available on request to Technical Appliance Corp., Sherburne, N. Y., or company's representatives.

"Bulletin F-2001," detailing a starter relay for aircraft jet engines and ground powerplants, available on request to Hartman Electrical Manufacturing Co., Mansfield, Ohio.

"Rubber Developments," a 40-page booklet issued by the British Rubber Development Board, available on request to Rubber Development Bureau, 1631 K St., N. W., Washington, D. C.

Bulletin describing the New Britain-Gridley Machine Division precision boring machine is available on request to New Britain Machine Co., New Britain, Conn.

Folder listing known applications for low temperature melting alloys is available on request to Cerro de Pasco Copper Corp., 40 Wall St., New York 5.

ADVERTISERS IN THIS ISSUE

AVIATION WEEK—AUGUST 15, 1949

Adel Precision Products Corp. 24
Agency—The McCarty Co.

Aeroproducts Div., G. M. C. 32
Agency—Kircher, Helton & Collett, Inc.

Akron Convention Bureau 38
Agency—Griffiths Enterprises, Inc.

American Airmotive Corp. 12
Agency—Houck & Co. of Florida, Inc.

American Electroneering Co., The 22

Ames Co., B. C. 38
Agency—Henry A. Loudon Adv., Inc.

Anti-Corrosive Metal Products Co., Inc. 44
Agency—Woodard & Fris, Inc.

Auburn Spark Plug Co., Inc. 4
Agency—Spitz & Webb Adv.

Chase Aircraft Co., Inc. 8

Chevrolet Motor Div., G. M. C. 25
Agency—Campbell-Ewald Co.

Cities Service Oil Co. 50
Agency—Ellington & Co., Inc.

Collins Radio Company 34, 35
Agency—McCann-Erickson, Inc.

Du Pont de Nemours & Co., Inc., E. I. Third Cover
Agency—Batten, Barton, Durstine & Osborn, Inc.

Eclipse-Pioneer Div. of Bendix Aviation Corp. 40
Agency—MacManus, John & Adams, Inc.

Elastic Stop Nut Corp. of America Second Cover
Agency—G. M. Basford Co.

Electrical Engineering & Mfg. Corp. 36
Agency—West-Marquis, Inc.

Ex-Cell-O Corporation 31
Agency—Holden-Clifford-Flint, Inc.

Fafnir Bearing Co., The 5
Agency—Horton-Noyes Co.

Fenwal Incorporated 33
Agency—James Thomas Chirurg Co.

Firestone Tire & Rubber Co., The 54
Agency—The Sweeney & James Co.

General Electric Company ..... Fourth Cover
Agency—G. M. Basford Co.

Grumman Aircraft Engineering Corp. Front Cover
Agency—Charles W. Hoyt Co., Inc.

Gulf Oil Corporation 39
Agency—Young & Rubicam, Inc.

Hotel Lexington, Inc. 65
Agency—Elmo Ecker Advertising

International Nickel Co., Inc., The 58
Agency—Marschalk & Pratt Co.

Johns-Manville Corp. 3
Agency—J. Walter Thompson Co.

Lord Manufacturing Company 9
Agency—W. S. Hill Company

Luria Engineering Corp. 44
Agency—Rickard & Co., Inc.

Marman Products Co., Inc. 30
Agency—West-Marquis, Inc.

Martin Co., The Glenn L. 49
Agency—Vansant, Dugdale & Co., Inc.

Packard Electric Div., G. M. C. 46
Agency—Campbell-Ewald Co.

Parker Appliance Company 19
Agency—Fuller & Smith & Ross, Inc.

Searchlight Section 61, 62, 63

Standard Oil Co. of Indiana 23
Agency—McCann-Erickson, Inc.

Superior Tube Company 41
Agency—Renner Advertisers

Surface Combustion Corp. 57
Agency—Odiorne Industrial Adv.

Thermo Electric Company 60
Agency—Fred Lange Associates, Inc.

Townsend Company 28
Agency—Bond & Starr, Inc.

Truscon Steel Company 10
Agency—Meldrum & Fewsmith, Inc.

U. S. Steel Corporation 53
Agency—Batten, Barton, Durstine & Osborn, Inc.

United States Steel Supply Co. 22
Agency—Batten, Barton, Durstine & Osborn, Inc.

Van Dusen Aircraft Supplies 65
Agency—Strohmeier Associates

Waldes Kohinoor, Inc. 27
Agency—Grey Adv. Agency, Inc.

Wayne Pump Co., The 60
Agency—Bonsib Adv. Agency, Inc.

Whittaker Co., Ltd., Wm. R. 43
Agency—The McCarty Co.

Wittek Manufacturing Co. 59
Agency—The Advertising Corp.

Wright Aeronautical Corp. 20
Agency—Charles Dallas Reach Co., Inc.

Wyman Gordon Company 6
Agency—John W. Odlin Co., Inc.

■

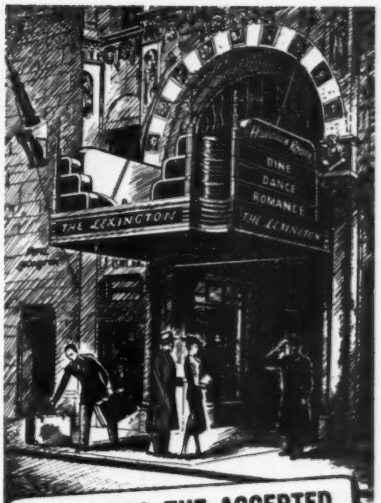
SEARCHLIGHT SECTION
(Classified Advertising)

EMPLOYMENT
Positions Vacant 61

EDUCATIONAL
Schools 61

PLANES-EQUIPMENT
(Used or Surplus New)
For Sale 61-63

WANTED
Equipment 61



FOR YEARS, THE ACCEPTED
NEW YORK
"HEADQUARTERS"
OF AVIATION EXECUTIVES

Hotel Lexington
LEXINGTON AVENUE AT 48th ST., N. Y. C. 17
HOME OF THE Hawaiian Room
CHARLES E. ROCHESTER, President
George W. Miller, Resident Manager

MORE AND MORE
YOU HEAR:

Yes, more and more you hear airline purchasing agents, airport operators and private owners saying, "We're Usin' Van Dusen." They know that for 10 years Van Dusen has made it a point to handle only quality supplies at the right prices and always with prompt, friendly service.

As a result 14 major AIRLINES regularly buy a wide variety of supplies from Van Dusen at the best possible prices. Over 800 AIRPORT SERVICE OPERATORS have found Van Dusen a good outfit to deal with for all their supply needs. EXPORTERS like Van Dusen's convenient New York office and Teterboro warehouse close to New York shipping facilities for speedier handling of orders.

For all the right aircraft products at the right prices, try Van Dusen and see the difference.

Van Dusen
AIRCRAFT SUPPLIES
MINNEAPOLIS, TETERBORO, N. J.
Cable Address: VANDUSAIR, N. Y.

LETTERS

'Free of Opinions'

Your efforts to keep AVIATION WEEK up to date with all the latest news so vital to us in aviation and free of opinions and cheap smear campaigns so common in this day makes your magazine tops as far as I am concerned. I can read AVIATION WEEK from cover to cover and enjoy every page and never feel like I am being used as a platform for some writer's personal grudge against the people of someone else.

EDWIN S. BOYCE
TWA Check Pilot
2729 Forest Ave.
Kansas City, Mo.

Pity the Poor Owner

I just picked up AVIATION WEEK for June 27 and the first thing I saw was "Midget Orders" in Briefing for Dealers and Distributors by Alexander McSurely. It was a very interesting item, and I was impressed especially by the report of H. L. Wheeler of Buffalo Aeronautical Corp., analyzing his orders from operators, showing that approximately 73 percent of his orders amounted to $5 or less.

For a pilot and airplane owner, it is very interesting to see how they live on the other side of the tracks.

Mr. Wheeler is bemoaning the fact that his orders are for less than $5, and wants to find some way of having his customers spend more than $5 at a time. I can tell Mr. Wheeler one way in which he can increase his business. All he has to do is to get any private airplane into his shop for a repair job or an annual licensing, and he will eliminate the $5 order. The poor owner won't have $5 left to buy anything else.

I saw in your magazine two weeks ago pictures of numerous people, probably all big names in aviation, who were diagnosing the troubles with private flying. None of them took into consideration the plight of the poor owner. He seems to be a source of supply of nothing but dough. I just had my plane relicensed for a year, a regulation with the CAA, and it cost me $89 to license an airplane that didn't need licensing. It is a good airplane. The inspector that looked over my PT-19 said it was the best airplane he had looked at in two years, and it was a shame that I had to dig 100 holes in the wing center section and put in seaplane grommets in an airplane that didn't need them, and just because a few of these planes were found with rot in the wood spars. Everybody had to do it, and it cost me $89, thereby taking the joy of flying away from one more pilot. The ship is not going to be licensed next year.

None of the people that you questioned as to the poor showing of private flying gave a thought to the regulations imposed by the CAA or the cost of operation and ownership of airplanes. I have been flying planes since 1927, and have seen a lot of them come and go, and there have been plenty more left aviation via the pocketbook than there have by accident. If the powers-that-be would pay a little more attention to the poor sucker who owns an airplane, and thought more of making his flying agreeable, private aviation would expand instead of shrink.

H. DANA ROLFE
Rolfe Motor Co.
Seneca Falls, New York

Misplaced Effort

I have read with much interest your editorial comment July 18 entitled, "Why Lawyers Love Aviation."

Our company is engaged in the conversion and maintenance of large executive aircraft and holds a CAB certificate as a Large Irregular Aircarrier. The purpose to which this certificate is put is strictly in the line of our business—i.e., we substitute one of our custom executive aircraft when an aircraft of a client is tied up for maintenance; charter aircraft to executive friends of our clients whose companies do not own this type ship; and occasionally handle an ambulatory patient.

Yet a protest has been entered with the CAB by legal counsel of every leading airline in the country!

Although we have not engaged legal counsel as yet, it has been necessary to reply to each protest at considerable length. The protest from United Air Lines is 11 pages long, printed on legal size paper. At least they probably earned their fee.

It appears that not enough emphasis is being placed upon the maintenance of the aircraft being used in the transportation of people for hire, and too much time and money that should be used for this purpose is being consumed in the manner you describe.

WILLIAM F. REMMERT, President
Remmert-Werner, Inc.
St. Louis 21, Mo.

Stall-Spin

You published a letter June 20 by J. Robert Chapman of the Kansas City office of the Associated Aviation Underwriters. Mr. Chapman's letter questioned the dangers of the stall and spin, indicating that he thought the elimination of the spin would not bring about a reduction in accidents and fatalities from stalls. He also asks that figures be supplied to prove or disprove his contention.

I will agree with Mr. Chapman that the elimination of the spin in itself may not reduce the fatalities from the stall type accident; however, we do have some figures which show that the Ercoupe (which has both spin-proof features and a gentle stall) is a safer airplane in this regard.

In 1948, the last period for which we can obtain comparative figures from the CAB, the Ercoupe accident record compares with all other non-carrier accident record figures as follows:

	Ercoupe	*All Other Non-Carriers*
Number of Stall Accidents	28	1156
Number of Fatal Stall Accidents	3	412
Percent of Stall Accidents which were Fatal	10.7	35.6
Approximate Aircraft Registered Jan. 1, 1948	4148	92,644
Total Fatal Stall Accidents per 1000 Planes Registered	0.72	4.45

The above statistics prove that the fatal accidents resulting from stalls in the Ercoupe are less than one-sixth those of other aircraft when based upon the number of aircraft registered. Of course, the number of aircraft registered is not a good indication of the exposure to risks, since the number of hours of flying and the type of flying has a great deal of bearing on the exposure. Details of this nature are, however, not available and I therefore base the percentage on the registration as being the best available exposure measure.

It is further to be noted that, although we have a substantial number of stall accidents, the percentage of stall accidents producing fatalities is much less in the Ercoupe than in other aircraft. We have tried to dispel from people's minds that the Ercoupe is a foolproof airplane, since we know it is not. However, statistics time and again prove that although people have almost as many accidents with the Ercoupe as with other aircraft, the resultant injury to personnel is much less severe. We attribute the low fatality rate from Ercoupe stalls to the fact that, in addition to not spinning, the Ercoupe does not drop its nose severely when stalled and therefore the vertical velocity at the time of impact is much lower than most other stalled aircraft.

R. SANDERS, President
Sanders Aviation, Inc.
Riverdale, Md.

USAF Contracts

Your weekly feature, "Latest Bid Awards To Industry By U. S. Air Force," is an interesting and useful feature, but we noticed you once included a section on Invitations to Bid which we thought was of a value incomparably greater. We would like to see this made a regular feature of your magazine for it effectually gives the great many smaller companies of the aircraft supply industry continuous representation at Air Materiel Command. . . .

We think you have by far the best trade paper in the industry, and we wouldn't be without it.

E. G. CROFUT
Director of Engineering
Aerolab Development Co.
Pasadena 3, Calif.

(Air Force discontinued the list of invitations to bid until after the new fiscal year. The list has now been resumed.—Ed.)

Why Leading Aircraft Manufacturers

SPECIFY ENCLOSURES OF "LUCITE"

CONSOLIDATED VULTEE'S L-13 LIAISON AND AMBULANCE PLANE
and other modern military aircraft have enclosures of Du Pont "Lucite"* acrylic resin. Such enclosures are easy to install and maintain, and offer undistorted vision.

CRYSTAL-CLEAR!
Transmits 90-92% of visible light

STRONG AND TOUGH!
Tensile strength 7-8,000 psi
Flexural strength 12-16,000 psi

LIGHT IN WEIGHT!
Only 50% as heavy as glass

PROTECTS PERSONNEL!
Special-type "Lucite" filters out sunburning rays

RESISTS WEATHERING!
Unaffected by sunlight, rain and snow

THE RYAN "NAVION"
and many other private and commercial planes feature long-lasting enclosures of Du Pont "Lucite." This plastic is easy to fabricate in small or large pieces. Retains its shape.

SPECIFY "LUCITE" FOR BEST RESULTS!

Du Pont "Lucite" acrylic resin was used with outstanding success in World War II for canopies, nose sections, blisters, astrodomes, turrets and other vital parts of U. S. Army and Navy aircraft. "Lucite" is currently supplied in sheets of various sizes for use in leading military, commercial and private planes. If you need a transparent material for enclosures or other uses, keep "Lucite" in mind for best results! Mail coupon for more data or contact sales office nearest you: E. I. du Pont de Nemours & Co. (Inc.), Plastics Department, 350 Fifth Avenue, New York 1, N. Y.; 7 South Dearborn Street, Chicago 3, Ill.; 845 East 60th Street, Los Angeles 1, Calif. *REG U S. PAT. OFF.

DU PONT "LUCITE"

DU PONT

REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING THROUGH CHEMISTRY

MAIL THIS COUPON TODAY!

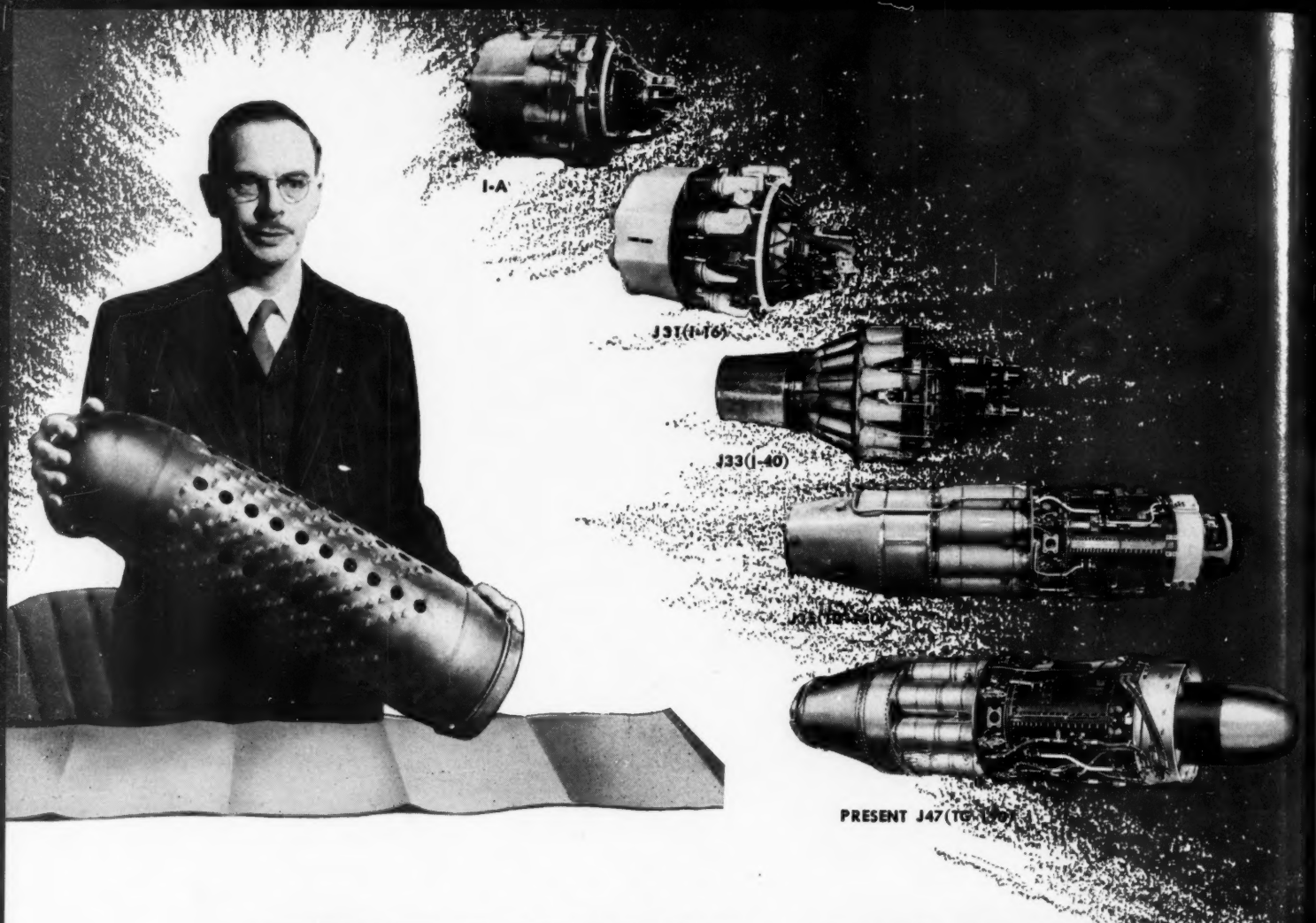
E. I. du Pont de Nemours & Co (Inc.)
Plastics Department
Wilmington 98, Delaware

Please send the latest literature on "Lucite" acrylic resin.

Name_____ Position_____

Firm_____

Address_____



CREATIVE POWER

- MOTORS AND CONTROL
- INSTRUMENTS
- TURBOSUPERCHARGERS
- CABIN SUPERCHARGERS
- GAS TURBINES FOR JET PROPULSION
- IGNITION AND TRANSFORMERS
- ACTUATORS
- GENERATORS AND POWER SYSTEMS

The creative power of D. F. "Truly" Warner, designing engineer with General Electric's Aircraft Gas Turbine Divisions, sparked the design or development of five great G-E jet engines. With an impressive design background in steam turbines and turbosuperchargers, Warner pioneered aircraft gas turbine development in this country. His first work was based on the original Whittle engine.

He designed the I-A and I-16 engines which powered Bell's P-59—the first jet-propelled plane in the United States. He supervised the design of the I-40 engine—power source for Lockheed's F-80 "Shooting Star." In 1945 he took over further development of the J35 engine originally designed in Schenectady. Shortly after, he supervised design and development of the J47, one of the most powerful jet engines in production. The J47 furnishes power for North American's F-86 and B-45A, Boeing's B-47, Republic's XF-91, and supplements G-E turbosupercharged piston engine power in Convair's B-36.

Many G-E engineers such as "Truly" Warner are working today to provide new and better products for you and the aviation industry. Your nearest G-E representative will describe in detail the aviation products we engineer and manufacture. See him today. *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC